AC 20.08.22 ITEM NO: 1.26.1

Deccan Education Society's

Kirti M. Doongursee College of Arts, Science and Commerce (AUTONOMOUS)

Affiliated to

UNIVERSITY OF MUMBAI

Syllabus for
Program: Bachelor of Science
Course: F.Y.B.SC.
Subject: Zoology

Choice Based Credit System (CBCS)
with effect from
Academic Year 2022-2023

SYLLABUS FOR

F.Y.B.Sc. ZOOLOGY UNIT WISE DISTRIBUTION

Semester I		**Semester II**	
Course 1 KUSZO22101	**Course 2** KUSZO22102	**Course 3** KUSZO22201	**Course 4** KUSZO22202
Unit 1 Wonders of animal world	Unit 1 Laboratory Safety and Units of Measurement	Unit 1 Population Ecology	Unit 1 Nutrition and Health
Unit 2 Biodiversity and its Conservation	Unit 2 Anima l Biotechnology	Unit 2 Ecosystem	Unit 2 Public Health and Hygiene
Unit 3 Footsteps to follow	Unit 3 Instrumentation	Unit 3 National Parks and Sanctuaries	Unit 3 Pollution
Practical KUSZOP22101	Practical KUSZOP22101	Practical KUSZOP22201	Practical KUSZOP22201

SYLLABUS FOR

Course – ZOOLOGY

To be implemented from Academic year 2022-23

SEMESTER - I

PAPER CODE	UNIT	TOPICS	CREDITS	LECTURES/ WEEK
KUSZO22101	I	Wonders of animal world	2	1
	I I	Biodiversity and its Conservation		1
	III	Footsteps to follow		1
KUSZO22102	I	Laboratory safety and Units of Measurement	2	1
	II	Animal Biotechnology		1
	III	Instrumentation		1
KUSZOP22101	Practical based on both courses		2	6

SEMESTER - II

COURSE CODE	UNIT	TOPICS	CREDITS	LECTURES/ WEEK
KUSZO22201	I	Population Ecology	2	1
	II	Ecosystem		1
	III	National Park and Sanctuaries		1
KUSZO22202	I	Nutrition and Health	2	1
	II	Public health and Hygiene		1
	III	Pollution		1
KUSZOP22201	Practical based on both courses		2	6

F. Y. B.Sc.-SEMESTER I

(KUSZO22101)
PAPER-I: Study of Animal world and its Biodiversity

OBJECTIVES:

1. *To make the learners aware of the animals around them and to develop in their interest the study of animal world.*
2. *To orient learners about rich heritage of biodiversity of India and make them understand significance of its conservation.*

COURSE OUT COME:

1. *Learners would develop an interest in the fascinating world of animals.*
2. *Learners would appreciate treasure of Biodiversity, its importance and hence would contribute their best for its conservation*

Unit 1: Wonders of Animal World (15 L)

1.1**:** **Echolocation** in Bats and Cetaceans - Dolphins and Whales

1.2: Mechanism of Pearl formation in Mollusca

1.3 **:** **Bioluminescence in Animals:** Noctiluca, Glow worm, Firefly, Angler Fish (Mechanism and use for the animal)

1.4**:** **Regeneration in Animals** - Earthworm (Annelida) and Lizard (Reptile)

1.5 **:** **Mimicry in Butterflies and its significance**: Great Egg fly and Common Crow, Common Palm fly and Plain Tiger.

1.6: Mechanism of Coral formation and types of Coral reefs.

1.7**:** **Bird migration:** Definition, types and factors inducing bird migration.

1.8**:** **Adaptive features of desert animals:** Reptiles (Phrynosoma) and Mammals (Camel).

1.9**:** **Breeding and Parental care**:

1.9.1 : Pisces - Ovo-viviparous (Black Molly/Guppy), Mouth brooders (Tilapia), Brood pouches (Seahorse)

1.9.2: Amphibia - Mouth brooders (Darwin's Frog), Egg carriers (Midwife Toad)

1.9.3: Mammals- Egg-laying (Duck-billed Platypus), Marsupials (Kangaroo)

1 .10: Aves: Brood Parasitism (Cuckoo)

Unit 2: Biodiversity and its Conservation **(15 L)**

2.1**: Introduction to Biodiversity** - Definition, Concepts, Scope and Significance.

2.2 **: Levels of Biodiversity** - Introduction to Genetic, Species and Ecosystem Biodiversity.

2.3**: Introduction of Biodiversity Hotspots-** (Western Ghats and Indo- Burma Border).

2.4**: Values of biodiversity** - Direct and Indirect use value.

2.5**: Threats to Biodiversity** - Habitat loss and Man-Wildlife conflict.

2.6 : Biodiversity conservation and management-

2.6.1 : Conservation strategies: *in situ,* ex-situ, National parks, sanctuaries and Biosphere reserves.

2.6.2 : Introduction to International efforts: Convention on Biological Diversity (CBD), International Union for Conservation of Nature and Natural Resources (IUCN), United Nations Environment Program - World Conservation Monitoring Centre (UNEP-WCMC).

2.6.3: National Biodiversity Action Plan, 2002.

2.6.4 : Introduction to Indian Wildlife (Protection) Act, 1972and Convention for International Trade of endangered species

Unit 3: Footsteps to follow **(15 L)**

3.1: Dr. Hargobind Khorana (Genetic code)

3.2: Dr. Varghese Kurien (Amul –White revolution)

3.3: Dr. Salim Ali (Ornithologist)

3.4: Anna Hazare (Water Conservation-Ralegan Siddhi)

3.5: Baba Amte (Anandvan)

3.6: Kiran Mazumdar Shaw (Biocon)

3.7: Gadre Fisheries (Surimi)

Two cases preferably of local importance to the college be additionally taught.

(KUSZO22102)

PAPER-II: Instrumentation and Biotechnology

OBJECTIVES:

1. To make learners aware of risks involved in handling of different hazardous chemicals, sensitive (electrical/electronic) instruments and infectious biological specimens especially during practical sessions in the laboratory and to train them to avoid mishap

2. To acquaint learners with the modern developments and concepts of Zoology and their role in human welfare.

COURSE OUTCOME:

1. Learners would work safely in the laboratory and avoid occurrence of accidents (mishaps) which will boost their scholastic performance.

2. Learners would understand recent advances in the subject and their applications for the betterment of mankind; and their young minds would be tuned to think out of the box.

3. Students will be skilled to select and operate suitable instruments for the studies they would undertake.

Unit 1: Laboratory safety, Units and Measurement

(15L) 1.1: Introduction to good laboratory practices.

1.2**: Use of safety symbols**: meaning, types of hazards and precautions.

1.3 **: Units of Measurement**:

1.3.1 : Calculations and related conversions of each: Metric system- length (meter to micrometer); weight (gram to microgram), Volumetric (Cubic measures)**.**

1.3.2 : Temperature: Celsius, Fahrenheit, Kelvin**.**

1.3.3**:** Concentrations: Percent solutions, ppt, ppm, ppb dilutions, Normality, Molarity and Molality.

1.3.4 **:** Biostatistics: Introduction and scope, Sampling and its types, Central Tendencies (mean, median, mode) Tabulation, Graphical representations (Histograms, bar diagrams, pie diagrams).

Unit 2: Animal Biotechnology (15L)

2.1 **: Biotechnology**: Scope and achievements of Biotechnology (Fishery, Animal Husbandry, Medical, Industrial).

2.2 **: Transgenesis**: Retro viral method, Nuclear transplantation method, DNA microinjection method and Embryonic stem cell method.

2.3**:** Cloning (Dolly)

2.4**:** Ethical issues of transgenic and cloned animals

2.5 : Applications of Biotechnology:

2.5.1 **:** DNA fingerprinting: Technique in brief and its application in Forensic Science (Crime Investigation)

2.5.2 **:** Recombinant DNA in medicines (recombinant insulin)

2.5.3 **:** Gene therapy: Ex-vivo and *in vivo,* Severe Combined Immunodeficiency (SCID), Cystic Fibrosis

2.5.4 **:** Green genes: Green Fluorescent Protein (GFP) from Jelly fish- valuable as reporter genes used to detect food poisoning.

Unit 3: Instrumentation (15L)

3.1**: Microscopy-** Construction, principle and applications of dissecting and compound microscope.

3.2 : **Colorimetry and Spectroscopy -** Principle and applications.

3.3**: pH- Sorenson's pH scale, pH meter -** principle and applications.

3.4**: Centrifuge -** Principle and applications (clinical and ultracentrifuges).

3.5**: Chromatography -** Principle and applications (Partition and Adsorption)

3.6**: Electrophoresis -** Principle and applications (AGE and PAGE)

LEARNERS SPACE:

1. Some of the marine fishes generate electric current. Study it's mechanism by using any search engine from internet. Comment on its Biological significance.
2. What is meant by captive breeding? Where is it practiced?
3. Study the unique features of Ammocoetus larva and Axolotl larva in vertebrates.
4. What are Bionanomaterials? What would be the size of nanomaterils used in Nanotechnology?
5. How do you obtain distilled water and Deionised water in the laboratory? Give its significance in the laboratory work.
6. What are the properties of potable water?
7. Refer the principles and applications of GLC and TLC.

Paper I

REFERENCES AND ADDITIONAL READING

1. Wonders of the Animal World - University Text Book of Zoology, F.Y.B.Sc.

Semester I Course 1. V.V. Dalvie, G.B. Raje, P. Sardesai, N.S. Prabhu,

University Press.

2. Vertebrate Zoology Volume I- Jordan and Verma , S. Chand and Co.

3. Invertebrate Zoology Volume II- Jordan andVerma , S. Chand and Co.

4. Invertebrate Zoology- T. C. Majupuria , S. Nagin and Co.

5. Chordate Zoology- P. S. Dhami and J. K. Dhami , R. Chand and Co.

6. Invertebrate Zoology- P. S. Dhami and J. K. Dhami , R. Chand and Co.

7. Introduction to Vertebrates- Moore Cambridge University- Low Priced Edition

8. Zoology- S. A. Miller and J. B. Harley, Tata McGraw Hill

9. Modern Textbook of Zoology, Invertebrates, R. L. Kotpal

10. Fundamentals of Ecology- E. P. Odum , Sunders Publication

11. Fundamentals of Ecology- M.C.Dash-2
nd edition, Tata McGraw Hill
12. Essentials of Ecology and Environmental Science - S.V.S Rana
13. Biodiversity- S.V.S Rana- Prentice Hall Publications
14. Modern Biology- V. B. Rastogi
15. Biology of Mollusca- D. R. Khanna
16. A Textbook of Zoology, Vol. II- T. Jeffery Parker and William. A. HaswellLow Price Publications
17. Ecology and Environment- P. D. Sharma, R. K. Rastogi Publications
18. Introduction to Ecology- R. Dajoz
19. Wildlife Laws and its Impact on Tribes- Mona Purohit , Deep and Deep
Publications
20. Biodiversity- K.C.Agarwal- Agro Botanica Publications
21. Butterflies of India – Isaac Kehimkar- BNHS Publication

Paper II

1.Basic Laboratory Techniques, Instrumentation and Biotechnology- University
Text Book of Zoology, F.Y.B.Sc. Semester I Course 2. V.V. Dalvie, R. G.
Deshmukh, R. D'souza and H.U. Shingadia University Press.
2. Introduction to Practical Biochemistry – David T. Plummer (Tata McGraw
Hill Publishing Co. Ltd.)
3. Introductory Practical Biochemistry – S.K. Sawhney and Randhir Singh
(Narosa Publishing House)
4. Methods in Biostatistics – B. K. Mahajan, (Jaypee Publications)
5. Microscopy and Cell Biology - V. K. Sharma, (Tata McGraw Hill Publishing
Co. Ltd.)
6. Bioinstrumentation – L. Veerakumari, (M.J.P. Publishers)
7. Principles and Techniques of Practical Biochemistry – Keith Wilson and John
Walker, (Cambridge University Press)
8. Biotechnology- Thieman and Pallidino, Pearson edu.
9. Biotechnology –Glick and Pasternak
10.Biochemistry –Satyanarayana
11.Understanding biotechnology- Aluizio Borem ,David Bowe-Low price edition
–Pearson Publication

12.A Textbook of Biotechnology – R. C. Dubey, S. Chand Publication.
13.A Manual of Medical Laboratory Technology -A. H. Patel, Navneet Prakashan Ltd.
14.Biological instruments and methodology – Dr. P. K. Bajpai, S. Chand company Ltd.
15.Calculations in Molecular biology and Biotechnology - Frank H. Stephenson, Academic Press.

SEMESTER I: Practical I (KUSZOP22101)

1. Mounting of foraminiferan shells from sand (any 3)

2. Study of types of Corals - Brain, Organ pipe, Stag Horn, Mushroom coral Study of

3Study of the following;

a. Symbiosis (Termite and Trychonympha, hermit crab and sea anemone)

b. Camouflage (leaf insect, chameleon)

c. Cannibalistic mate-eating animals (Spider and Praying Mantis)

d. Animal architects: Termites, Harvester ant and Baya weaver bird

e. Study of bioluminescent organisms – Noctiluca, glow worm, fire fly, angler fish.

4. Breeding and parental care in Amphibia- Rhacophorus, Midwife toad, Darwin's frog, Caecilian.

5. Mounting of scales of fish (placoid, cycloid and ctenoid)

6 a) Study of Adaptive radiation in Reptiles - Turtle, Tortoise, Phrynosoma, Draco)

b) Identification and differentiation of venomous and non-venomous snakes (Scales, Fangs, Bite marks, etc.)

7. Study of Types of feathers(contour, filoplume, down), beaks(Nectar feeding , Insect catching, Fruit eating, Scavenging, Filter feeding), claws (perching, wading, swimming, hopping) in birds

8 a. Identification of birds - Coppersmith Barbet, Bulbul, Rose ringed Parakeet, Magpie Robin, two local birds.

b. Field Report – To be done in a group of ten students (submission of written / typed report preferably along with photographs/ tables/ graphs.

Other Suggested topics for field observation/survey:

- Butterflies/ Fishes/ Migratory birds of local area.
- Variations in Human like Attached vs. Free Earlobes, Blood Groups, Eye colour, etc. using statistical method.

9. Observations of fauna in the field (with reference to theory syllabus).

*Note - The practicals may be conducted by using specimens authorised by the wildlife and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/ simulations / models, etc. as recommended by the UGC and as envisaged in the regulations of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practicals mentioned here-in-above.

#There shall be at least one excursion/field trip

SEMESTER I: Practical II (KUSZP22101)

1. Interpretation of safety symbols (toxic, corrosive, explosive, flammable, skin irritant, oxidizing agent, compressed gases, aspiration hazards and Bio hazardous infectious material.)
2. Preparation of Molar solutions of any three chemicals.
3. Study of central tendencies and plotting of bar diagram, histogram and pie diagram.
4. Identification of transgenic fish (Trout and Salmon) / cloned animals (Dolly sheep, cc cat and Snuppy dog) from photograph.
5. a) Study of pH meter
   b) Calculation of pH of three different samples (one and neutral) using pH paper/Universal Indicator and confirming the result

   each acidic, alkaline with pH meter
6. a) Demonstration of Electrophoretic technique.
   b) Application of DNA Fingerprinting in criminology (photograph of electrophoretic pattern to be given for interpretation by the students)
7. a) Study of parts of microscope and their functions.
   b) Technique of focusing a permanent slide under 10x and 45x (objectives).
8. a) Study of Colorimeter. Dilution of given sample and estimation of OD by using colorimeter.
   b) Calculation of concentration from the given OD using formula.
9. a) Separation of amino acids from the mixture by paper chromatography.
   b) Calculation of Rf value of separated pigments/amino acids from given chromatogram and their identification from standard chart.
10. a) Separation of pigments by adsorption chromatography using chalk.
    b) Separation of lipids by TLC,

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Websites referred to change the syllabus

1. **www.sgbau.ac.in Sant Gadgebaba Amravati University, Amravati, (M.S.)**
2. **bhu.ac.in Banaras Hindu University, Varanasi (U.P.)**
3. **nmu.ac.in Kavyatri Bahinabai North Maharashtra University, Jagaon(M.S.) 4.msubaroda.ac.in The Maharaja Sayajirao University, Vadodara (Gujrat)**

SEMESTER-II

(KUSZO22201)

Paper I: Ecology and Wild life management

OBJECTIVES:

1. *To facilitate the learning of population ecology, its dynamics and regulatory factors important for its sustenance.*
2. *To impart knowledge of different components of ecosystem and educate about essentials of coexistence of human beings with all other living organisms.*
3. *To enlighten learners about the current status of wild life conservation in India in the light of guidelines from different relevant governing agencies vis-à-vis with adversity of poaching and bio piracy.*

COURSE OUT COME:

1. *This study would allow the learner to know about nature of animal Population, specific factors affecting specific factor affecting its growth and its impact on the population of other life forms.*

2. *Learners will grasp the concept of interdependence and interaction of physical, chemical and biological factors in the environment.*

3. *Learners would be inspired to choose career options in the field of wild life conservation, research, photography and ecotourism*.

Unit 1: Population ecology: (15 L)

1.1 : Population dynamics

1.1.1 : Population density
1.1.2 :Natality
1.1.3 :Mortality
1.1.4 :Fecundity
1.1.5 : Age structure
1.1.6 : Sex ratio
1.1.7 : Life tables
1.1.8 : Survivorship curves
1.1.9 : Population dispersal and distribution patterns
1.1.10 Niche concept

1.2 : Population growth regulation

1.2.1 : Intrinsic mechanism – Density dependent fluctuations and oscillations

1.2.2 : Extrinsic mechanism- Density independent, environmental and climate factors, population interactions

1.3 : Population growth pattern

1.3.1 : Sigmoid

1.3.2 : J Shaped

1.4 **:** Human census (India) – Concept, mechanism and significance

Unit:2 Ecosystem **(15L)**

2.1 : Concept of Ecosystems

2.1.1 **:** Ecosystem - Definition and components

2.1.2 **:** Impact of temperature on biota

2.1.3 **:** Biogeochemical cycles (Water, Oxygen, Nitrogen, Sulphur) 2.1.4**:** Fresh water ecosystem – Lentic and Lotic

2.1.5 **:** Food chain and food web in ecosystem (Fresh water and Grassland).

2.1.6 **:** Ecological pyramids - energy, biomass and number.

2.1.7 **:** Animal interactions (commensalism, mutualism, predation, antibiosis, parasitism)

Unit:3 National Parks and Sanctuaries of India

(15L) 3.1: Concept of Endangered and Critically Endangered species using examples of Indian Wildlife with respect to National Parks and Wild life Sanctuaries of India (Sanjay Gandhi National Park, Tadoba Tiger Reserve, Corbett National Park, Kaziranga National Park, Gir National Park, Silent Valley, Pirotan Island Marine Park, Keoladeo Ghana National Park, Bandipur Sanctuary)

3.2 **:** Management strategies with special reference to Tiger and Rhinoceros in India

3.3**:** Ecotourism

3.4**:** Biopiracy

SEMESTER-II

(KUSZO22202)

Paper-II: Nutrition, Public health and hygiene, Pollution

OBJECTIVES:

1. To make learners understand the importance of balanced diet and essential nutrients of food at different stages of life.

2. To impart knowledge about source, quantum and need for conservation of fast depleting water resource and essentials of maintaining proper sanitation, hygiene and optimizing use of electronic gadgets.

3. To understand causes and ill effects of atmospheric pollution.

COURSE OUT COME:

1. *Healthy dietary habits would be inculcated in the life style of learners in order to prevent risk of developing health hazards in younger generation due to faulty eating habits*.
2. *Learners will understand the importance of water conservation and personal hygiene.*
3. *Learners will be more thoughtful in using the natural resources and may also guide their peers for the same.*

Unit 1: Nutrition and Health (15 L)

1.1 **:** Concept of balanced diet, dietary recommendations to a normal adult, infant, pregnant woman and aged.

1.2 **:** Malnutrition disorders – Anemia (B12 and Iron deficiency), Rickets, Marasmus, Goiter, Kwashiorkar (cause, symptoms, precaution and remedy).

1.3 **:** Constipation, piles, starvation, acidity, flatulence, peptic ulcers (cause, symptoms, precaution and remedy).

1.4 **:** Obesity (Definition and consequences), BMI calculation and its significance.

1.5 **:** Importance of fibres infood.

1.6 **:** Significance of breastfeeding.

1.7 **:** Swine flu (cause, symptoms, precaution andremedy).

1.8 **:** Covid-19(cause, symptoms, prevention and precaution)

Unit: 2 Public Health and Hygiene (15L)

2.1.1 **:** Definition of Health, the need for health education and health goal.

2.1.2 **:** Physical, psychological and Social health issues.

2.1.3 **:** WHO and its programmes - Polio, Small pox, Malaria and Leprosy (concept, brief accounts and outcome with respect to India).

2.1.4 : Ill effects of self-medication.

2.2 : Water and water supply

2.2.1 **:** Sources and properties of water.

2.2.2 **:** Purification of water, small scale, medium scale and large scale (rapid sand filters)

2.2.3 **:** Water footprint (concept, brief accounts and significance).

2.3 : Hygiene:

2.3.1 **:** Hygiene and health factors at home, personal hygiene, oral hygiene and sex hygiene.

2.4 : Radiation risk:

2.4.1 **:** Mobile Cell tower and electronic gadgets (data of recommended level, effects and precaution).

2.5 **: Blood bank** – Concept and significance

Unit: 3. Pollution (15L)

3.1 : Introduction

3.2 : Causes, effects and control measures of pollution

3.2.1**:** Air Pollution

3.2.2: Water Pollution

3.2.3: Soil Pollution

3.2.4: Solid waste pollution

3.2.5: Noise pollution

3.3: Case studies on pollution:

Bhopal Gas Tragedy, The Minamata disaster, Effect of air pollution on Taj Mahal, Acidification of Great Barrier reef, Diclofenac as a threat to Indian vultures

LEARNERS SPACE:

1. To protect wildlife from extinction now a day Satellite Technology is used in Sanctuaries and National Parks. How do they obtain images of their behaviour by using a way of modern wildlife

techniques?

2. Find ecological significance of every species of animal world.
3. What is meant by captive breeding?Where is it practiced?
4. What is Nephelometry? What is its use?
5. As a Nutritionist prepare guidelines to maintain physical fitness of your age.
6. Compare demography of any one developing and developed Nations,

PAPER: I and II

REFERENCES AND ADDITIONAL READING

1. Introduction to Ecology and Wildlife - University Text Book of Zoology, F.Y.B.Sc. Semester II Course 3. UniversityPress.
2. Ecology - Mohan P. Arora , Himalaya PublishingHouse
3. Field Biology and Ecology -- Alen H. Benton and William E. Werner ,Tata McGraw Hill ltd, NewDelhi
4. Ecology and Environment - Sharma P. D , RastogiPublication,Mumbai
5. Ecology : Principles and Applications - Chapman J.L , Cambridge University trust
6. Ecology - Subramaniam and Others, NarosaPublishingHouse.
7. Wildlife laws and its impact on tribes - Mona Purohit, Deep and deep Publication.
8. Economic Zoology, Biostats and Animal Behaviour - Shukla, Mathur, Upadhyay, Prasad. RastogiPublications.
9. Common Diseases, Health and Hygiene - University Text Book of Zoology, F.Y.B.Sc. Semester II Course 4. UniversityPress.
10. Common Medical Symptoms edited - P. J. Mehta National Inblisents and Distributions.
11. Parks Textbook of Preventive and Social Medicine K. ParkM/S BanarasidasBhanotJabalpar.
12. Human Physiology – Volume I – II C. C. Chatterjee, Medical Allied agency,Kolkatta.

13. Parasitology (Protozoology and Helminthoology) - K. D. Chatterjee, ChatterjeeMedialPublishers.
14. Nand's handbook of Forensic Medicine and Toxicology - ApurbaNandy, NCBApublication.
15. Essentials of Public Health and Sanitation- Part I and Part II. All India Institute of Local SelfGovernment.
16. Epidemiology and Management for Health Care for all. P.V. Sathe,A. P. Sathe, Popular Prakashan, Mumbai.
17. Textbook of Medical Parasitology- C. K. JayaramPaniker. JaypeeBrothers.
18. A Treatise on Hygiene and Public Health. -B. N. Ghosh. Calcutta Scientific PublishingCompany.
19. Clinical Dietetics and Nutrition - F. P. Antia and Philip, Oxford UniversityPress.
20. Nutrition: Principles and Application in Health Promotion - J. B. Lippincott Company.Philadelphia.
21. Food Nutrition and Health- Dr. ShashiGoyal, Pooja Gupta, S. Chand Publications. Food and Nutrition – Vol. I and II - Dr. Swaminathan ,BappcoPublication.
22. Dr.Parvish Pandya- A talk on Animal Behaviour https://youtu.be/hFSBx9F-fwg

Western Ghats https://youtu.be/mfSuc6C2mb0
24. Yoga at Home Yoga at Family for physical fitness https://youtu.be/2IXMHR07_A8
25. Human Nutrition and Health - You Tube: University of Surrey

SEMESTER II: Practical I (KUSZOP22201)

1. Interpretation of the given graphs/ tables and comment on pattern of population nature:
   i. Survivorship curve
   ii. Life tables
   iii. Fecundity tables
   iv. Age structure
   v. Sex ratio

2. a) Calculation of Natality, Mortality, Population density from given data.
   b) Estimation of population density by capture recapture method.

3. Interpretation of Growth curves (Sigmoid and J shaped).

4. Estimation of hardness from given water sample. (tap water v/s well water).

5. Estimation of Free carbon dioxide (Free CO_2) from two different samples- aerated drinks (diluted) v/s tap water.

6. Identification and interpretation of aquatic and terrestrial (Grassland) food and food webs chains.

7. Construction of food chain/food web using given information/data.

8. a) Identification and interpretation of ecological pyramids of energy, biomass and number
   b) Construction of different types of pyramid from given data.

9. Study of the following:
   a) Endangered (Great Indian Bustard, Asiatic lion, Blackbuck, Olive Ridley sea turtle) and critically endangered species (Slender-billed vulture, Gharial, Malabar civet) of Indian wildlife and state reasons for their decline

   b) Study Biodiversity hotspots using world map (Western Ghats and Indo- Burma).

10. Study of sanctuaries, national parks, biosphere reserves in India with respect to its brand fauna as listed in theory)

SEMESTER II: Practical –II (KUSZOP22201)

1. Qualitative test of heavy metals iron and lead.
2. Water Analysis- Physical properties
3. Milk adulterants (starch and glucose), methylene blue reduction Test (MBRT).
4. Food adulteration Test: Food Adulterants in Cheese, Butter, Jaggery, Ghee, Honey, Iodised Salt.
5. Study of Common medicines.
6. Study of causes and symptoms of anemia, acidity, obesity, constipation and goiter and kwashiorkor diseases
7. Study of Human parasites.
    1. Endoparasites - Protozoans (*Entamoeba, Plasmodium*), Helminths (*Ascaris, Wuchereria*),Ectoparasites (Head louse, tick) and Exoparasites (Bed bug, Mosquito).
8. Screening of anaemic/non-anaemic persons using CuSO4method.

9..First Aid – Demonstration Practical Training for teachers and students to be conducted by the experts from Red cross, Civil defence, Civic authorities by individual institute or cluster colleges in rotation.

9. BMI analysis - Measurement of Height/ Weight and calculation of BMI using formula, preparation and submission of report. (10 students/ group-50readings/group)

***Note - The practicals may be conducted by using specimens authorised by the wildlife and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/ simulations / models, etc. as recommended by the UGC and as envisaged in the regulations of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practicals mentioned here-in-above.**

Note: There shall be at least one excursion/field trip.

Websites referred to change the syllabus

1.www.sgbau.ac.in Sant Gadgebaba Amravati University, Amravati, (M.S.)

2.bhu.ac.in Banaras Hindu University, Varanasi (U.P.)

3. nmu.ac.in Kavyatri Bahinabai North Maharashtra University,

Jagaon(M.S.) 4.msubaroda.ac.in The Maharaja Sayajirao University,

Vadodara (Gujrat

DEPARTMENT OF ZOOLOGY

Evaluation Scheme for First Year (UG) under AUTONOMY

I. Internal Evaluation for Theory Courses – 40 Marks

(i) Continuous Internal Assessment 1 (Assignment-Tutorial) – 20 Marks

(ii) Continuous Internal Assessment 2 – 20 Marks (Class Test with Fill in the Blanks, True or False & Answer the following)

II. External Examination for Theory Courses – 60 Marks

Duration: 2 Hours

Theory question paper pattern:

All questions are compulsory.

Question	Based on	Options	Marks
Q.1	Unit I , II & III	*12 Questions 6 MCQS & 6 Answer in One Sentence*	12
Q.2	Unit I	*Descriptive (Out of 3 attempt any two)*	12
Q.3	Unit II	*Descriptive (Out of 3 attempt any two)*	12
Q.4	Unit III	*Descriptive (Out of 3 attempt any two)*	12
Q.5	Unit I , II & III	*Short notes (Out of 6 attempt any 4)*	12

- All questions shall be compulsory with internal choice within the questions.
- Each Question may be sub-divided into sub questions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.

III. Practical Examination

- Each core subject carries 50 Marks (30 marks External + 20 marks Internal)

Sr. No.	Undergraduate Practical Internal Evaluation:	Marks
1	Short Experiment/Field Trip/Excursion/Industrial Visit Report	15
2	Journal	5

Sr. No.	Undergraduate Practical External Evaluation:	Marks

1	Experiment/s	25
2	Viva	5

- Duration: 2 Hours for each practical course.
- Minimum 80% practical from each core subjects are required to be completed.
- Certified Journal is compulsory for appearing at the time of Practical Exam