Shri Vile Parle Kelavani Mandal's

[ITHIBAI COLLEGE OF ARTS, CHAUHAN INSTITUTE OF SCIENCE & AMRUTBE

JIVANLAL COLLEGE OF COMMERCE AND ECONOMICS (AUTONOMOUS)

NAAC Reaccredited 'A' grade, CGPA: 3.57 (February 2016),

Granted under RUSA, FIST-DST & -Star College Scheme of DBT, Government of India,

Best College (2016-17), University of Mumbai

Affiliated to the

UNIVERSITY OF MUMBAI

Program: B.Sc.

Course: NEW

Semester I

Choice Based Credit System (CBCS) with effect from the Academic year 2021-22

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.A./ B.Sc./ B.Com. - Zoology, the learners should be enriched with knowledge and be able to-

PSO1: _____
PSO2: _____
PSO3: _____
PSO4: _____
PSO5: _____
PSO6: _____
PSO7: _____
PSO8: _____

Preamble

While presenting this new syllabus under the autonomous status of the college of Semester I and Semester II (F. Y. B.Sc.) Zoology, efforts have been made to seek inputs of all the stake holders to make it relevant, useful for both students and teachers. In the first meeting of the Board of Studies inputs were obtained from the experts of various fields of zoology such as industry, research scholars with international exposure, students and faculty of school of science affiliated to NMIMS University.

While following the guidelines of UGC, use of animals is excluded from the practicals, substituting the same with audio-visual, ICT and simulation aids and that the syllabus is made more interesting with new, innovative topics. Care has been taken to make the syllabus interesting and informative being at first year level to make learners to understand different aspects of the subject of zoology. Also efforts are taken to introduce relevant topics so that students will get stimulated to the basic concepts of research in the zoology and also to influence them to become job givers than job seekers.

With co-operation of teachers and participation of students the syllabus would create good interest in the mind of learners about the subject and equip them with the knowledge which can be useful in their day to day life if they opt out the subject in higher classes and would become stepping stone for those who would continue with the same for S. Y. and T. Y. of UG level and M. Sc. at PG level.

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Evaluation Pattern

The performance of the learner will be evaluated in two components. The first component will be a Continuous Assessment with a weightage of 25% of total marks per course. The second component will be a Semester end Examination with a weightage of 75% of the total marks per course. The allocation of marks for the Continuous Assessment and Semester end Examinations is as shown below:

a) Details of Continuous Assessment (CA)

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Continuous Assessment	Details	Marks
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Component 2 (CA-2)	**Test /Assignment/Tutorial/Visit/ Project/ Presentation**	10 marks

b) Details of Semester End Examination

75% of the total marks per course. Duration of examination will be two and half hours.

Question Number	Description	Marks	Total Marks
		Total Marks	**75**

Signature Signature Signature

HOD Approved by Vice –Principal Approved by Principal

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: B.Sc . (2021-22)				**Semester: I**	
Course: STUDY OF LIFE PROCESSES				**Course Code: NEW**	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Assessment (CA) (Marks - 25)**	**Semester End Examinations (SEE) (Marks- 75 in Question Paper)**
02	**02**	**---**	**02+01=03**	25	75

Learning Objectives:

- To introduce the concepts of physiology of nutrition, excretion, osmoregulation, respiration, circulation, nervous system and reproduction.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand the increasing complexity of nutritional, excretory and osmoregulatory mechanism in different form of Animals.

CO2: Correlate the habit and habitat of animals with respiratory and circulatory organs.

CO3: Understand the role of nervous system and reproductive mechanism in different animals.

Outline of Syllabus: (per session plan)

Module	**Description**	**No of Hours**
1	**<u>Nutrition and Excretion</u>** **1.1:** Comparative study of nutritional apparatus (structure and function): Hydra, Cockroach, Pigeon, Ruminants **1.2:** Physiology of digestion in human **1.3:** Comparative study of excretory and osmoregulatory organs (structures and function): Amoeba, Planaria, Cockroach, Marine fish **1.4:** Categorization of animals based on principal nitrogenous excretory products **1.5:** Structure of mammalian kidney and uriniferous tubule	10
2	**<u>Respiration and Circulation</u>** **2.1:** Comparative study of respiratory organs (structure and function): Earthworm, Spider, Bony fish, and Pigeon **2.2:** Structure of Alveolus, exchange and transport of respiratory gases and Chloride Shift Theory **2.3:** Types of circulation: (a) Open and Closed type (b) Single and Double type **2.4:** Comparative study of hearts: Fish, Frog, Crocodile and Rat **2.5:** Structure and Mechanism of working of heart in human	10
3	**<u>Nervous system and Reproduction</u>** **3.1:** Irritability in Paramecium, nerve net in Hydra, nerve ring and nerve cord in earthworm **3.2:** Types of neurons based on the structure and function, Conduction of nerve impulse: Synaptic transmission **3.3:** Asexual reproduction-Fission, Fragmentation, Gemmule formation and Budding **3.4:** Sexual reproduction-Gametogenesis, Structure of male and female gametes in	10

	human **3.5:** Oviparity, Viviparity and Ovo-viviparity	
	Total	**30**

To develop scientific temper and interest by exposure through industrial visits and study/educational tours is recommended in each semester

Suggested Readings / Reference Books:

1. Vertebrate Zoology Volume I-Jordan and Verma, S. Chand and Co.
2. Invertebrate Zoology Volume II-Jordan and Verma, S. Chand and Co.
3. Invertebrate Zoology-Majupuria T. C., Nagin S. and Co.
4. Chordate Zoology-Dhami P. S. and Dhami J. K., R. Chand and Co.
5. Invertebrate Zoology-Dhami P. S. and Dhami J. K., R. Chand and Co.
6. Introduction to Vertebrates-Moore Cambridge University, Low Priced Edition
7. Zoology-Miller S. A. and Harley J. B., Tata McGraw Hill.
8. Modern Textbook of Zoology: Invertebrates-Kotpal R. L., Rastogi Publications
9. Biological Science-Taylor D.J., Stout G.W., Green N.P.O, Soper R., Cambridge University Press.
10. A Manual of Practical Zoology: Invertebrates-P. S. Verma and V. K. Agarwal, S. Chand Publication

Unit	Topic	No. of Hours/Credits
Module 1	Nutrition and Excretion	**10 hrs**
Module 2	Respiration and Circulation	**10 hrs**
Module 3	Nervous system and Reproduction	**10 hrs**

PRACTICAL

Zoology Practical-I: 2 hrs/week

1) Urine analysis-Normal and Abnormal constituents
2) Detection of ammonia excreted by fish from aquarium water
3) Study of nutritional Apparatus (Amoeba, Hydra, Earthworm, Pigeon, Ruminants)
4) Study of respiratory structures (Gills of bony fish and cartilaginous fish, Lungs of frog, Lungs of mammal)
5) Accessory respiratory structure (Anabas/Clarius) and Air sacs of Pigeon

6) Study of blood cells
7) Study of hearts (Cockroach, shark, frog, garden lizard, mammal)
8) Study of permanent slides on Reproduction (Sponge gemmule, Hydra budding, T.S. of mammalian testis, T.S. of mammalian ovary)

***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.**

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Date: 19th October, 2020

To,
Member Secretary,
Academic Council,
Mithibai College (Autonomous),
Vile Parle- West

Subject: Agenda for Academic Council meeting scheduled on _____

Dear Member Secretary,

Kindly include the following agenda for the meeting of Academic Council scheduled for 27th October, 2020.

(Example- Agenda items to be in brief statements)
i) To approve the format for submission of agenda, notes thereto and curriculum to Academic council
ii) To confirm/ approve syllabus for _____
iii) To confirm/ approve----------

Thanking you,

Yours Sincerely,
Head of_____

Recommended by :

Vice-Principal

and Approved by:

I/C Principal

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

DEPARTMENT OF _____

BOARD OF STUDIES – MEETING

Date -_____ 2020 **Time: 2:00 PM**

Online on MS Teams

AGENDA

1)

2)

3)

4)

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

RESOLUTION

At the online Board of Studies -_____ meeting held on _____ at _____ on MS Teams, it was resolved that –

1)

2)

3)

4)

S.No.	BOS Members	Signature
1	_____ – Chairperson	
2	Two subject experts outside the parent University: a) b)	
3	Vice-Chancellor -University of Mumbai nominee a)	
4	Representative from Industry a)	
5	Post-graduate meritorious alumnus a)	
6	Members of same faculty - a) b)	
7	Member appointed by Management a)	
8	Faculty members a)	

	b) c) d)	

MINUTES OF MEETING

S.No.	Agenda Item	Discussion
1.		
2.		
3.		
4.	Any other matter:	

Shri Vile Parle Kelavani Mandal's

[ITHIBAI COLLEGE OF ARTS, CHAUHAN INSTITUTE OF SCIENCE & AMRUTBE

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Semester I

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PSO5: _____
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Question Number	Description	Marks	Total Marks
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HOD Approved by Vice –Principal Approved by Principal

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: B.A./ B.Sc . / B.Com. (2021-22)				**Semester: I**	
Course: INSTRUMENTATION & BIOTECHNOLOGY				**Course Code: NEW**	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Assessment (CA) (Marks - 25)**	**Semester End Examinations (SEE) (Marks- 75 in Question Paper)**
02	**02**	**---**	**02+01=03**	25	75

Learning Objectives:

- To make Learners aware of risks involved in handling of different hazardous chemicals, sensitive instruments and infectious biological specimens.
- To acquaint learners about modern developments in the subject and their applications.
- To provide all learners a complete insight about the principles of operations and applications of instruments required in Zoology

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Work safely in the laboratory and avoid occurrence of accidents.

CO2: Understand recent advances in the subject and their applications for the betterment of mankind.

CO3: Be skilled to operate suitable instruments for the studies of different components of the subject.

Outline of Syllabus: (per session plan)

Module	**Description**	**No of Hours**
1	**<u>Laboratory safety and Units of Measurement</u>** **1.1:** Introduction to good laboratory practices **1.2:** Use of safety symbols: meaning, types of hazards and precautions **1.3:** Units of measurement: Calculations and related conversions of each: Metric system-length (meter to micrometer); weight (gram to microgram), Volumetric (Cubic measures) Temperature (Celsius, Fahrenheit, Kelvin), Concentrations (Percent solutions, ppt, ppm, ppb dilutions, Normality, Molarity and Molality) **1.4:** Biostatistics: Introduction and scope, Sampling and its types, Central Tendencies (mean, median, mode)	10
2	**<u>Biotechnology</u>** **2.1:** Biotechnology: Scope and advantages of Biotechnology (Fishery, Animal Husbandry, Medicine, Industry, Agriculture) **2.2:** Cloning in animals with suitable examples (minimum two) **2.3:** Ethical issues of animal biotechnology **2.4:** Applications of Biotechnology: DNA fingerprinting (Technique in brief and its application), Forensic science (Crime Investigation), Recombinant DNA in medicines (recombinant insulin), Gene therapy (*Ex vivo* and *In vivo,* Severe Combined Immunodeficiency-SCID, Cystic Fibrosis)	10
3	**<u>Instrumentation</u>** **3.1:** Microscopy-Principle and applications of Dissecting and Compound microscopes **3.2:** Colorimetry and Spectroscopy-Principle and applications **3.3:** Centrifuge-Principle and applications (clinical and ultra-centrifuges)	10

	3.4: Chromatography-Principle and applications (Partition and Adsorption) **3.5:** Electrophoresis-Principle and applications (AGE and PAGE)	
	Total	**30**

To develop scientific temper and interest by exposure through industrial visits and study/educational tours is recommended in each semester

Suggested Readings/ Reference Books:

1. Introduction to Practical Biochemistry–David T. Plummer, Tata McGraw Hill Publishing Co. Ltd.
2. Introductory Practical Biochemistry–S.K. Sawhney and Randhir Singh, Narosa Publishing House
3. Methods in Biostatistics–B. K. Mahajan, Jaypee Publications
4. Microscopy and Cell Biology-V. K. Sharma Tata McGraw Hill Publishing Co. Ltd.
5. Bioinstrumentation–L. Veerakumari, M.J.P. Publishers
6. Principles and Techniques of Practical Biochemistry–Wilson and Walker, Cambridge University Press
7. Introduction to Biotechnology-Thieman and Palladino, Pearson Publication
8. Molecular Biotechnology–Glick and Pasternak, ASM Press
9. Understanding Biotechnology-Aluizio Borem, David Bowe, Low price edition–Pearson Publication
10. A Textbook of Biotechnology–R. C. Dubey, S. Chand Publication
11. A Manual of Medical Laboratory Technology-A. H. Patel, Navneet Prakashan Ltd.
12. Biological instruments and methodology–Dr. P. K. Bajpai, S. Chand Company Ltd.
13. Calculations in Molecular biology and Biotechnology-Frank H. Stephenson, Academic Press

Unit	**Topic**	**No. of Hours/Credits**
Module 1	Laboratory safety and Units of Measurement	**10 hrs**
Module 2	Biotechnology	**10 hrs**
Module 3	Instrumentation	**10 hrs**

PRACTICAL

Zoology Practical II: 2hrs/week

1) Interpretation of safety symbols (toxic, corrosive, explosive, flammable, skin irritant, oxidizing, compressed gases, aspiration hazards and Biohazardous infectious material)

2) Study of central tendencies and plotting of bar diagram, histogram and pie diagram.

3) Identification of transgenic fish (Trout and Salmon) / cloned animals (Dolly sheep, cc cat and Snuppy dog) from photograph.

4) Application of DNA Fingerprinting in criminology (photograph of electrophoretic pattern to be given for interpretation by the students)

5) Study of parts of microscope and their functions.

6) a) Dilution of given sample and estimation of OD (Optical Density/Absorbance) by using colorimeter

b) Calculation of concentration from the given OD using formula.

7) Determination of pH of three different samples (one each acidic, alkaline and neutral) using pH paper / Universal Indicator / pH indicator from red cabbage

8) 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.

c) Separation of pigments by adsorption chromatography using chalk

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Course: NEW

Semester II

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Signature Signature Signature

HOD Approved by Vice –Principal Approved by Principal

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: B.Sc . (2021-22)				**Semester: II**	
Course: ECOLOGY & BIODIVERSITY				**Course Code: NEW**	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Assessment (CA) (Marks - 25)**	**Semester End Examinations (SEE) (Marks- 75 in Question Paper)**
02	**02**	**---**	**02+01=03**	25	75

Learning Objectives:

- To impart knowledge about essentials of coexistence of human being with all other living organisms.
- To orient learners about rich heritage of Biodiversity of India
- To enlighten learners about biodiversity conservation in India and its importance to human being

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand interaction of different environmental factors and implications of loss of fauna and flora.

CO2: Appreciate treasure of Biodiversity, its importance and hence would contribute their best for its conservation.

CO3: Be inspired to choose career in biodiversity conservation, research, photography and ecotourism.

Outline of Syllabus: (per session plan)

Module	**Description**	**No of Hours**
1	**<u>Ecosystem</u>** **1.1:** Concept of Ecosystems: Definition and components **1.2:** Impact of temperature on biota **1.3:** Biogeochemical cycles (Oxygen, Nitrogen, Sulphur) **1.4:** Food chain and food web in ecosystem (Fresh water and Grass land) **1.5:** Ecological pyramids-energy, biomass and number **1.6:** Animal interactions (commensalism, mutualism, predation, antibiosis, parasitism and amensalism)	10
2	**<u>Biodiversity</u>** **2.1:** Introduction to Biodiversity-Definition, Concepts, Scope and Significance **2.2:** Levels of Biodiversity-Introduction to Genetic, Species and Ecosystem Biodiversity **2.3:** Biodiversity Hotspots-Western Ghats and Indo-Burma Border **2.4:** Values of biodiversity-Direct and Indirect use value **2.5:** Biodiversity conservation and management: 2.5.1**:** Conservation strategies: *in situ* and *ex situ* (National parks, Sanctuaries, Biosphere reserves, Zoo, Botanical Gardens, Seed Bank/DNA Bank) 2.5.2**:** Introduction to Indian Wildlife (Protection) Act, 1972 and Convention for International Trade of endangered species 2.5.3**:** National Biodiversity Action Plan, 2002	10
3	**<u>National parks and Sanctuaries</u>** **3.1:** Concept of Endangered and Critically Endangered species using examples of Indian Wildlife	10

	3.2: Study of National Parks and Wildlife Sanctuaries of India (Sanjay Gandhi National Park, Tadoba Tiger Reserve, Jim Corbett National Park with emphasis on Project Tiger, Kaziranga National Park with emphasis on Project Rhinoceros, Gir National Park, Bharatpur Sanctuary) **3.3:** Ecotourism–Concept and advantages	
	Total	**30**
		2hrs/week

To develop scientific temper and interest by exposure through industrial visits and study/educational tours is recommended in each semester

Suggested Readings/ Reference Books:

1. Fundamentals of Ecology-Eugene P. Odum and Gary W. Barrett, Brooks/Cole/Cengage Publishers
2. Fundamentals of Ecology-M. C. Dash , Tata McGraw Hill company Ltd, New Delhi
3. Ecology-Mohan P. Arora, Himalaya Publishing House
4. Field Biology and Ecology-Alen H. Benton and William E. Werner ,Tata McGraw Hill ltd, New Delhi
5. Ecology and Environment-Sharma P. D , Rastogi Publication, Mumbai
6. Ecology: Principles and Applications-Chapman J. L , Cambridge University Trust
7. Ecology-Subramaniam and Others, Narosa Publishing House
8. Wildlife Laws and its impact on tribes-Mona Purohit, Deep and Deep Publications
9. Biology-Eldra Solomon, Linda R. Berg and Diana W. Martin, Thomson/Brooks/Cole Publishers

Unit	Topic	No. of Hours/Credits
Module 1	Ecosystem	**10 hrs**
Module 2	Biodiversity	**10 hrs**
Module 3	National parks and Sanctuaries	**10 hrs**

PRACTICAL I

Zoology Practical I: 2 hrs/week

1) Estimation of hardness from given water sample (tap water v/s well water)
2) Estimation of Free carbon dioxide (Free CO_2) from two samples-aerated drink (diluted) v/s tap water
3) Identification and interpretation of aquatic and terrestrial (Grassland) food chains and food webs
4) Construction of food chain and food web using given information/data
5) Identification and interpretation of ecological pyramids of energy, biomass and number

6) Construction of different types of ecological pyramids from given data

7) Study of 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

8) Study of Sanctuaries, national parks and biosphere reserves of India with respect to its brand fauna

***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

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Date: 19th October, 2020

To,
Member Secretary,
Academic Council,
Mithibai College (Autonomous),
Vile Parle- West

Subject: Agenda for Academic Council meeting scheduled on _____

Dear Member Secretary,

Kindly include the following agenda for the meeting of Academic Council scheduled for 27th October, 2020.

(Example- Agenda items to be in brief statements)
i) To approve the format for submission of agenda, notes thereto and curriculum to Academic council
ii) To confirm/ approve syllabus for _____
iii) To confirm/ approve----------

Thanking you,

Yours Sincerely,
Head of_____

Recommended by :

Vice-Principal

and Approved by:

I/C Principal

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

DEPARTMENT OF _____

BOARD OF STUDIES – MEETING

Date -_____ 2020 **Time: 2:00 PM**

Online on MS Teams

AGENDA

1)

2)

3)

4)

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

RESOLUTION

At the online Board of Studies -_____ meeting held on _____ at _____ on MS Teams, it was resolved that –

1)

2)

3)

4)

S.No.	BOS Members	Signature
1	_____ – Chairperson	
2	Two subject experts outside the parent University: a) b)	
3	Vice-Chancellor -University of Mumbai nominee a)	
4	Representative from Industry a)	
5	Post-graduate meritorious alumnus a)	
6	Members of same faculty - a) b)	
7	Member appointed by Management a)	
8	Faculty members a) b) c)	

	d)	

MINUTES OF MEETING

S.No.	Agenda Item	Discussion
1.		
2.		
3.		
4.	Any other matter:	

Shri Vile Parle Kelavani Mandal's

[ITHIBAI COLLEGE OF ARTS, CHAUHAN INSTITUTE OF SCIENCE & AMRUTBE

JIVANLAL COLLEGE OF COMMERCE AND ECONOMICS (AUTONOMOUS)

NAAC Reaccredited 'A' grade, CGPA: 3.57 (February 2016),

Granted under RUSA, FIST-DST & -Star College Scheme of DBT, Government of India,

Best College (2016-17), University of Mumbai

Affiliated to the

UNIVERSITY OF MUMBAI

Program: B.Sc.

Course: NEW

Semester II

Choice Based Credit System (CBCS) with effect from the Academic year 2021-22

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.A./ B.Sc./ B.Com. - Zoology, the learners should be enriched with knowledge and be able to-

PSO1: _____
PSO2: _____
PSO3: _____
PSO4: _____
PSO5: _____
PSO6: _____
PSO7: _____
PSO8: _____

Preamble

While presenting this new syllabus under the autonomous status of the college of Semester I and Semester II (F. Y. B.Sc.) Zoology, efforts have been made to seek inputs of all the stake holders to make it relevant, useful for both students and teachers. In the first meeting of the Board of Studies inputs were obtained from the experts of various fields of zoology such as industry, research scholars with international exposure, students and faculty of school of science affiliated to NMIMS University.

While following the guidelines of UGC, use of animals is excluded from the practicals, substituting the same with audio-visual, ICT and simulation aids and that the syllabus is made more interesting with new, innovative topics. Care has been taken to make the syllabus interesting and informative being at first year level to make learners to understand different aspects of the subject of zoology. Also efforts are taken to introduce relevant topics so that students will get stimulated to the basic concepts of research in the zoology and also to influence them to become job givers than job seekers.

With co-operation of teachers and participation of students the syllabus would create good interest in the mind of learners about the subject and equip them with the knowledge which can be useful in their day to day life if they opt out the subject in higher classes and would become stepping stone for those who would continue with the same for S. Y. and T. Y. of UG level and M. Sc. at PG level.

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Evaluation Pattern

The performance of the learner will be evaluated in two components. The first component will be a Continuous Assessment with a weightage of 25% of total marks per course. The second component will be a Semester end Examination with a weightage of 75% of the total marks per course. The allocation of marks for the Continuous Assessment and Semester end Examinations is as shown below:

a) Details of Continuous Assessment (CA)

25% of the total marks per course:

Continuous Assessment	Details	Marks
Component 1 (CA-1)	**Test / Assignment/ Tutorial/ Visit/ Project/ Presentation**	15 marks
Component 2 (CA-2)	**Test / Assignment/ Tutorial/ Visit/ Project/ Presentation**	10 marks

b) Details of Semester End Examination

75% of the total marks per course. Duration of examination will be two and half hours.

Question Number	Description	Marks	Total Marks
		Total Marks	**75**

Signature Signature Signature

HOD Approved by Vice –Principal Approved by Principal

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: B.Sc . (2021-22)				**Semester: II**	
Course: POPULATION ECOLOGY, POLLUTION & EMBRYOLOGY				**Course Code: NEW**	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Assessment (CA) (Marks - 25)**	**Semester End Examinations (SEE) (Marks- 75 in Question Paper)**
02	**02**	**---**	**02+01=03**	25	75

Learning Objectives:

- To facilitate the learning of population ecology, its dynamics and regulatory factors.
- To provide a panoramic view of impact of human activities leading to pollution and its implications.
- To acquaint the learner with key concepts of embryology.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Know nature of animal population, specific factors affecting its growth and its impact on other life form.
CO2: Be sensitized about the adverse effects of pollution.
CO3: Understand and compare different types of gametes and embryonic developmental stages.

Outline of Syllabus: (per session plan)

Module	**Description**	**No of Hours**
1	**<u>Population Ecology</u>** **1.1:** Population dynamics**:** Population density, Natality**,** Mortality**,** Fecundity**,** Age structure**,** Sex ratio**,** Life tables**,** Survivorship curves**,** Population dispersal and distribution patterns**,** Niche concept **1.2:** Population growth regulation**:** Intrinsic mechanism (Density dependent-fluctuations and oscillations) and Extrinsic mechanism (Density independent-environmental and climate factors) **1.3:** Population growth pattern**:** Sigmoid and J Shaped **1.4:** Human census (India) - Concept, mechanism and significance	**10**
2	**<u>Pollution and its Effect on Organisms</u>** **2.1:** Air Pollution - Types and sources of air pollutant**,** Effects of air pollution on organisms, its control and abatement measures **2.2:** Water Pollution - Types and sources of water pollutant, Effects of water pollution on organisms, its control and abatement measures **2.3:** Sound Pollution - Different sources of sound pollution, Effects of sound pollution on organisms, its control and abatement measures **2.4:** Pollution by solid wastes - Types and sources, Effects of solid waste pollution, its control and abatement measures **2.5** Climate Change and Global Warming	**10**
3	**<u>Comparative Embryology</u>** **3.1:** Types of Eggs- Based on amount and distribution of yolk **3.2:** Structure and Types of Sperms **3.3:** Types of Cleavages-Holoblastic and Meroblastic	**10**

	3.4: Types of Blastulae **3.5:** Types of Gastrulae	
	Total	**30 hrs**

To develop scientific temper and interest by exposure through industrial visits and study/educational tours is recommended in each semester

Suggested Readings/Reference Books:

1. Introduction to Population Ecology-Larry Rockwood, 2nd Edition, Wiley-Blackwell Publication
2. Air pollution-Kudesia V. P. Pragati Prakasan, Meerut
3. Fundamentals of air pollution-Daniel A. Vallero, Academic Press
4. Principles and practices of air pollution control and analysis-J. R. Mudakanil K International Pub. House
5. Text Book of air pollution and its control-S. C. Bhatia Atlantic
6. Water pollution-Kudesia V.P., Pragati Prakasan, Meerut
7. A Text book of Environmental Chemistry and Pollution Control-S. S. Dogra, Swastik Publication
8. Practical methods for water and air pollution monitoring-S.K. Bhargava, New Age International
9. Hand book of water and waste water analysis-Kanwaljit Kaur, Atlantic
10. Aquatic Pollution-Edward A. Laws, Wiley Publishers
11. Environmental Science and Technology-Stanely E. Manahan, CRC Press
12. Environmental Chemistry-A. K. De, New Age International
13. A Text book of Environmental Studies-Gurdeep R. Chatwal and Harish Sharma, Himalaya Publication
14. Developmental Biology-Scot F. Gilbert, 5th Edition, Sinauer Associates Inc.
15. Developmental Biology-Subramoniam T., Narosa Publishers.
16. Developmental Biology-Berril. N. J., Tata McGraw–Hill Publication.
17. The early embryology of the chick-Bradley M. Patten, P. Blakiston's Son & Co.
18. Embryology-Mohan P. Arora, Himalaya Publishing House
19. Chordate Embryology-Dalela,Verma and Tyagi

Unit	Topic	No. of Hours/Credits
Module 1	Population Ecology	**10 hrs**
Module 2	Pollution and its Effect on Organisms	**10 hrs**
Module 3	Comparative Embryology	**10 hrs**

PRACTICAL I

Zoology Practical II: 2 hrs/week

1) Interpretation of the given graphs/tables and comment on pattern of population nature: Survivorship curve, Fecundity, Age structure, 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) Study of air microflora

5) Estimation of dissolved oxygen from the given water sample

6) Estimation of salinity by refractometer from the given water sample

7) Study of sound pollution monitoring device

8) Study of the following permanent slides, museum specimens and materials
a) Mammalian sperm and ovum
b) Types of egg–fish, frog and hen
c) Cleavage, blastula and gastrula (Amphioxus, Frog and Bird)

9) Report writing based on documentary film/Field visit

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	b) c) d)	

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