II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2015-16

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Animal Diversity I

Class : I SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration : July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Introduction to Biology and Biodiversity	2	Black board/ charts/Group discussion
2.	Protozoa	7	Black board/ charts/ Group discussion
3.	Porifera	7	Black board/ charts/Group discussion
4.	Cnidaria	7	Black board/ charts/Group discussion
5.	Acnidaria	2	Black board/charts/ Group discussion
6.	Platyhelmithes	3	Black board/charts/ Group discussion
7.	Aschelmithes	5	Black board/ charts/Group discussion
8.	Annelida	9	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2015-16

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Animal Diversity II

Class : II SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration : January to May

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Onychophora	2	Black board/ charts/Group discussion
2.	Arthropoda	8	Black board/ charts/ Group discussion
3.	Mollusca	8	Black board/ charts/Group discussion
4.	Echinodermata	4	Black board/ charts/Group discussion
5.	Comparative study	8	Black board/charts/ Group discussion
6.	Hemichordata	3	Black board/charts/ Group discussion
7.	Chordata	8	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2015-16

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Animal Diversity III

Class : III SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration : July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Pisces	5	Black board/ charts/Group discussion
2.	Amphibia	5	Black board/ charts/ Group discussion
3.	Reptilia	5	Black board/ charts/Group discussion
4.	Aves	6	Black board/ charts/Group discussion
5.	Mammalia	6	Black board/charts/ Group discussion
6.	Type study- Rabbit	6	Black board/charts/ Group discussion
7.	Comparative anatomy	9	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2015-16

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Biochemistry and Physiology

Class : IV SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: January to May

Sl. No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Carbohydrates, Proteins and Lipids	10	Black board/ charts/Group discussion
2.	Nucleic Acids	7	Black board/ charts/ Group discussion
3.	Homeostasis, Thermoregulation	7	Black board/ charts/Group discussion
4.	Respiration, circulation	10	Black board/ charts/Group discussion
5.	Nitrogen Excretion, Muscular Contraction, Nervous Co-ordination	8	Black board/charts/ Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2015-16

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Cell and Molecular Biology

Class : V SEM- Paper V **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	The cell	1	Black board/ charts/Group discussion
2.	Memberane System	6	Black board/ charts/ Group discussion
3.	Mitochondria and Ribosomes	6	Black board/ charts/Group discussion
4.	Nucleus and Chromosome	8	Black board/ charts/Group discussion
5.	Cell division, Cancer Biology	7	Black board/charts/ Group discussion
6.	Immunology	7	Black board/charts/ Group discussion
7.	Gene and Protein synthesis	7	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2015-16

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Developmental Biology and Endocrinology

Class : V SEM- Paper VI **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Gametogenesis and Fertilization	6	Black board/ charts/Group discussion
2.	Parthenogenesis	6	Black board/ charts/ Group discussion
3.	Cleavage and Development of Frog	6	Black board/ charts/Group discussion
4.	Development of Chick and Foetal memberane	7	Black board/ charts/Group discussion
5.	Human Development and Human Endocrine System	7	Black board/charts/ Group discussion
6.	Hormonal Control of Reproduction and Family Planning	6	Black board/charts/ Group discussion
7.	Histology of Mammalian Organs	5	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2015-16

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Genetics and Evolution

Class : VI SEM- Paper VII **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: January to May

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Nature and Nutrure	7	Black board/ charts/Group discussion
2.	Interaction of Genes	7	Black board/ charts/ Group discussion
3.	Linkage	7	Black board/ charts/Group discussion
4.	Gene Mutation	7	Black board/ charts/Group discussion
5.	Organic Evolution and Population Genetics	8	Black board/charts/ Group discussion
6.	Speciation and Adaptations	6	Black board/charts/ Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2015-16

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Environmental Biology and Applied Zoology

Class : VI SEM- Paper VIII **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: January to May

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Introduction	6	Black board/ charts/Group discussion
2.	Biogeochemical Cycle and Food Chain	6	Black board/ charts/ Group discussion
3.	Ecosystem	6	Black board/ charts/Group discussion
4.	Zoogeography	6	Black board/ charts/Group discussion
5.	Applied Zoology-Introduction	6	Black board/charts/ Group discussion
6.	Biostatistics	5	Black board/charts/ Group discussion
7.	Ethology	7	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Animal Diversity I

Class : I SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration : July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Introduction to Biology and Biodiversity	2	Black board/ charts/Group discussion
2.	Protozoa	7	Black board/ charts/ Group discussion
3.	Porifera	7	Black board/ charts/Group discussion
4.	Cnidaria	7	Black board/ charts/Group discussion
5.	Acnidaria	2	Black board/charts/ Group discussion
6.	Platyhelmithes	3	Black board/charts/ Group discussion
7.	Aschelmithes	5	Black board/ charts/Group discussion
8.	Annelida	9	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Animal Diversity II

Class : II SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration : January to May

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Onychophora	2	Black board/ charts/Group discussion
2.	Arthropoda	8	Black board/ charts/ Group discussion
3.	Mollusca	8	Black board/ charts/Group discussion
4.	Echinodermata	4	Black board/ charts/Group discussion
5.	Comparative study	8	Black board/charts/ Group discussion
6.	Hemichordata	3	Black board/charts/ Group discussion
7.	Chordata	8	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Animal Diversity III

Class : III SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration : July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Pisces	5	Black board/ charts/Group discussion
2.	Amphibia	5	Black board/ charts/ Group discussion
3.	Reptilia	5	Black board/ charts/Group discussion
4.	Aves	6	Black board/ charts/Group discussion
5.	Mammalia	6	Black board/charts/ Group discussion
6.	Type study- Rabbit	6	Black board/charts/ Group discussion
7.	Comparative anatomy	9	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Biochemistry and Physiology

Class : IV SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: January to May

Sl. No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Carbohydrates, Proteins and Lipids	10	Black board/ charts/Group discussion
2.	Nucleic Acids	7	Black board/ charts/ Group discussion
3.	Homeostasis, Thermoregulation	7	Black board/ charts/Group discussion
4.	Respiration, circulation	10	Black board/ charts/Group discussion
5.	Nitrogen Excretion, Muscular Contraction, Nervous Co-ordination	8	Black board/charts/ Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Cell and Molecular Biology

Class : V SEM- Paper V **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	The cell	1	Black board/ charts/Group discussion
2.	Memberane System	6	Black board/ charts/ Group discussion
3.	Mitochondria and Ribosomes	6	Black board/ charts/Group discussion
4.	Nucleus and Chromosome	8	Black board/ charts/Group discussion
5.	Cell division, Cancer Biology	7	Black board/charts/ Group discussion
6.	Immunology	7	Black board/charts/ Group discussion
7.	Gene and Protein synthesis	7	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Developmental Biology and Endocrinology

Class : V SEM- Paper VI **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Gametogenesis and Fertilization	6	Black board/ charts/Group discussion
2.	Parthenogenesis	6	Black board/ charts/ Group discussion
3.	Cleavage and Development of Frog	6	Black board/ charts/Group discussion
4.	Development of Chick and Foetal memberane	7	Black board/ charts/Group discussion
5.	Human Development and Human Endocrine System	7	Black board/charts/ Group discussion
6.	Hormonal Control of Reproduction and Family Planning	6	Black board/charts/ Group discussion
7.	Histology of Mammalian Organs	5	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Genetics and Evolution

Class : VI SEM- Paper VII **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: January to May

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Nature and Nutrure	7	Black board/ charts/Group discussion
2.	Interaction of Genes	7	Black board/ charts/ Group discussion
3.	Linkage	7	Black board/ charts/Group discussion
4.	Gene Mutation	7	Black board/ charts/Group discussion
5.	Organic Evolution and Population Genetics	8	Black board/charts/ Group discussion
6.	Speciation and Adaptations	6	Black board/charts/ Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Environmental Biology and Applied Zoology

Class : VI SEM- Paper VIII **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: January to May

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Introduction	6	Black board/ charts/Group discussion
2.	Biogeochemical Cycle and Food Chain	6	Black board/ charts/ Group discussion
3.	Ecosystem	6	Black board/ charts/Group discussion
4.	Zoogeography	6	Black board/ charts/Group discussion
5.	Applied Zoology-Introduction	6	Black board/charts/ Group discussion
6.	Biostatistics	5	Black board/charts/ Group discussion
7.	Ethology	7	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2017-18

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Animal Diversity I

Class : I SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration : July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Introduction to Biology and Biodiversity	2	Black board/ charts/Group discussion
2.	Protozoa	7	Black board/ charts/ Group discussion
3.	Porifera	7	Black board/ charts/Group discussion
4.	Cnidaria	7	Black board/ charts/Group discussion
5.	Acnidaria	2	Black board/charts/ Group discussion
6.	Platyhelmithes	3	Black board/charts/ Group discussion
7.	Aschelmithes	5	Black board/ charts/Group discussion
8.	Annelida	9	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Animal Diversity II

Class : II SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration : January to May

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Onychophora	2	Black board/ charts/Group discussion
2.	Arthropoda	8	Black board/ charts/ Group discussion
3.	Mollusca	8	Black board/ charts/Group discussion
4.	Echinodermata	4	Black board/ charts/Group discussion
5.	Comparative study	8	Black board/charts/ Group discussion
6.	Hemichordata	3	Black board/charts/ Group discussion
7.	Chordata	8	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Animal Diversity III

Class : III SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration : July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Pisces	5	Black board/ charts/Group discussion
2.	Amphibia	5	Black board/ charts/ Group discussion
3.	Reptilia	5	Black board/ charts/Group discussion
4.	Aves	6	Black board/ charts/Group discussion
5.	Mammalia	6	Black board/charts/ Group discussion
6.	Type study- Rabbit	6	Black board/charts/ Group discussion
7.	Comparative anatomy	9	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Biochemistry and Physiology

Class : IV SEM **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: January to May

Sl. No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Carbohydrates, Proteins and Lipids	10	Black board/ charts/Group discussion
2.	Nucleic Acids	7	Black board/ charts/ Group discussion
3.	Homeostasis, Thermoregulation	7	Black board/ charts/Group discussion
4.	Respiration, circulation	10	Black board/ charts/Group discussion
5.	Nitrogen Excretion, Muscular Contraction, Nervous Co-ordination	8	Black board/charts/ Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Cell and Molecular Biology

Class : V SEM- Paper V **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	The cell	1	Black board/ charts/Group discussion
2.	Memberane System	6	Black board/ charts/ Group discussion
3.	Mitochondria and Ribosomes	6	Black board/ charts/Group discussion
4.	Nucleus and Chromosome	8	Black board/ charts/Group discussion
5.	Cell division, Cancer Biology	7	Black board/charts/ Group discussion
6.	Immunology	7	Black board/charts/ Group discussion
7.	Gene and Protein synthesis	7	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Developmental Biology and Endocrinology

Class : V SEM- Paper VI **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: July to October

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Gametogenesis and Fertilization	6	Black board/ charts/Group discussion
2.	Parthenogenesis	6	Black board/ charts/ Group discussion
3.	Cleavage and Development of Frog	6	Black board/ charts/Group discussion
4.	Development of Chick and Foetal memberane	7	Black board/ charts/Group discussion
5.	Human Development and Human Endocrine System	7	Black board/charts/ Group discussion
6.	Hormonal Control of Reproduction and Family Planning	6	Black board/charts/ Group discussion
7.	Histology of Mammalian Organs	5	Black board/ charts/Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Genetics and Evolution

Class : VI SEM- Paper VII **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: January to May

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Nature and Nutrure	7	Black board/ charts/Group discussion
2.	Interaction of Genes	7	Black board/ charts/ Group discussion
3.	Linkage	7	Black board/ charts/Group discussion
4.	Gene Mutation	7	Black board/ charts/Group discussion
5.	Organic Evolution and Population Genetics	8	Black board/charts/ Group discussion
6.	Speciation and Adaptations	6	Black board/charts/ Group discussion

II JAI SRI GURUDEV II

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2016-17

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Programme: B.Sc Paper name: Environmental Biology and Applied Zoology

Class : VI SEM- Paper VIII **Total Hours: 42hours**

Name of the faculty: KMR, BRM and HSV

Duration: January to May

Sl.No.	Topics covered	No. of Lecture Hours	Methodology/pedagogy
1.	Introduction	6	Black board/ charts/Group discussion
2.	Biogeochemical Cycle and Food Chain	6	Black board/ charts/ Group discussion
3.	Ecosystem	6	Black board/ charts/Group discussion
4.	Zoogeography	6	Black board/ charts/Group discussion
5.	Applied Zoology-Introduction	6	Black board/charts/ Group discussion
6.	Biostatistics	5	Black board/charts/ Group discussion
7.	Ethology	7	Black board/ charts/Group discussion

॥ **JAI SRI GURUDEV** ॥

LESION PLAN FOR B.SC. (CBCS) ZOOLOGY COURSE FOR THE ACADEMIC YEAR 2018-19

SUBJECT: ZOOLOGY
I SEMESTER: ZOOLOGY

DSC 1A: Animal Diversity-1 4 hr/ week X 16=64 hrs

Sl.No	Particulars	Datesfor 2018-19
1.	Introduction to Biology and Biodiversity; Biodiversity and its importance; Classification: five kingdom concept, Biological nomenclature, Definition of a species, outlines of animal classification.	11.06.2018
2.	Protozoa: General characters and classification up to classes with examples; Locomotion (amoeboid, flagellar and ciliary- excluding theories) and reproduction (fission and conjugation); Plasmodium: Morphology, life cycle, pathogenicity and preventive measures of *Plasmodium vivax*	28.06.2018
3.	Concept of Metazoa; Levels of organization - Cell, tissue, organ, organ system (Definition with examples); Porifera: General characters with classification up to classes with examples; Sponge spicules, canal system (Ascon, Sycon, leucon, rhagon) and larvae amphiblastula and parenchymula)	02.07.2018
4.	Cnidaria: General characters and classification up to classes with examples; Polymorphism in cnidaria- Obelia and Halistemma, Structure of corallite, types of coral reefs, importance of corals. Acnidaria: Salient features and systematic position of Ctenophora.	13.07.2018
5.	Concept of coelom: Acoelom, Pseudocoelom, Eucoelom (Definition with examples). Helminthes Platyhelminthes: General characters and classification up to classes with examples; *Taenia solium* - Life cycle, pathogenicity and preventive measures. Aschelminthes: General characters and examples; morphology, transmission, pathogenicity and preventive measures of *Ascaris ,Ancyclostoma* and *Wucheraria*. Parasitic adaptations in helminthes.	27.07.2018
6.	Annelida: General characters and classification up to classes with examples. Type study: i) Pheretima- Morphology, setae, digestive, circulatory, excretory (nephridium), nervous and reproductive systems, Trochophore larva and its significance; ii). Leech- Morphology and parasitic adaptations; iii) Tubiculous worms- tubiculous adaptations in *Nereis* and *chaetopterus*.	10.08.2018
7.	Onychophora: Salient features of *Peripatus* and systematic position of Onychophora. Arthropoda : General characters and classification up to classes with examples, Type study- Cockroach- Morphology, digestive, respiratory and nervous systems; direct and indirect development in insects- description with examples; harmful and beneficiary insects- brief general account with examples; social organization in insects (Terminte).	24.08.2018

8.	Mollusca: General characters and classification with examples; Type study- Fresh water Mussel- morphology, digestive, respiratory and nervous systems; foot in mollusca, Diversity in Molluscan shells .	04.09.2018
9.	Echinodermata: General characters and classification with examples; Type study- Star fish- morphology and water-vascular system; echinoderm larvae and their phylogenetic significance.	14.09.2018
10.	Regenerative ability in invertebrates; Symmetry in invertebrates (Cell aggregates, blind sac,tube within tube).	20.09.2018
11.	Revision	17.10 2018

I SEMESTER: ZOOLOGY

DSC 1A: I SEMESTER: ZOOLOGY 4 hrs/week x16= 64 hrs

Sl.No	Particulars	Dates for 2018-19
01.	A) Study of Microsope. B) Study of permanent slides of protozoa: Amoeba, Entamoeba, Polystomella. Euglena, Paramecium, Balantidum,Vorticella.	**15.06.2018**
02.	Preparation of protozoan culture by students and observation of protozoan culture	**22.06.2018**
03.	Porifera: Study of slides/specimens –Sycon, Spongilla, Euspongia,Sponge gemmule, Monaxon spicules.	**29.06.2018**
04.	Cnidaria: Hydra, Physalia, Aurelia, Ephyra larva, Metridium, Gorgonia, Madrepora Pennatula, Corallium rubrum, Fungia,Favia,Meandrina.	**06.07.2018**
05.	Helminthes: Planaria, Fasciola, Taenia, Ascaris-male and female Scolex of Taenia,T.S. of Taenia and Ascaris (male or female)	**20.07.2018**
06.	Annelida: Pheritima, Nereis, Chaetopterus, Aphrodite. Leech, T.S of Nereis and Leech	**27.07.2018**
08.	Temporary slide preparation of whole mounts of coelenterate colonies: Obelia, Sertularia,Bougainvillea, companularia , pennaria (any four)/Observation of permanent slides.	**03.08.2018**
09.	Onychophora: Peripatus,Arthropoda : Panaeus, Nauplius larva, Mysis larva. Scolopendra, Spirostreptus, Palamnaeus, Aranea,	**10.08.2018**
10.	Field study: Observation of Arthropods in and around the college campus, identifying and recording in the practical record (Minimum five insects).	**17.08.2018**
11.	Taxonomic study of insects up to orders giving key for identification, selecting any five locally available common examples and recording them.	**24.08.2018**
12.	Study of Arthropodan pests: Periplaneta, Rhinicerous beetle, Termite and Weevil. Study of Arthropodan vectors: Culex, Aedes, Anopheles mosquitoes and house fly.	**31.08.2018**
13.	Study of mouth parts of insects: Cockroach, female mosquito, house fly, and honey bee (permanent slides).	**07.09.2018**
14.	Cockroach: Study of digestive system and nervous system.	**14.09.2018**
15.	Mollusca: Chiton, Dentallium shell, Xancus shell, Aplysia, Unio, Octopus.	**21.09.2018**
16.	Echinodermata: - Astropecten, Ophiothrix, Salmacis, Holothuria. Echinodermata: Antedon, Bipinnaria larva, Pluteus larva, Pedicellaria of sea urchin.	**28.09.2018**
17.	Reversion	**17.10.2018**

III SEMESTER: ZOOLOGY

DSC 1C : ANIMAL PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY 4hr /week X 16=64 hr

Sl.No	**Particulars**	Dates for 2018-19
01.	**Homeostasis:** Definition and significance, water, glucose and salt balance. Osmoregulation: Osmoconformers and osmoregulators, osmoregulation in shark, marine and freshwater teleosts, terrestrial mammals (Kangaroo rat and Camel). **Thermoregulation:** Effects of temperature change- Q 10 effect, Causes of thermal deaths;Definition of ectotherm, endotherms, poikilotherms, and homeotherms, Heterotherms; Temperature compensation in poikilotherms and homeotherms; A note on aestivation and hibernation.	**15.06.2018**
02.	**Digestion:** Hunger and apetite; digestion and absorption of carbohydrates, proteins and lipids. **Respiration:** Physiology of respiration – exchange of gases; Transport of oxygen, oxygen dissociation curve-Bohr's effect, Transport of carbon dioxide – chloride shift, respiratory quotient; Cellular respiration: Glycolysis, Kreb's cycle, oxidative phosphorylation, energy budget.	**30.06.2018**
03.	**Circulation:** Structure and functions of human heart, regulation of heart beat, blood pressure, Mechanism of blood clotting. **Nitrogen Excretion:** Types of nitrogen excretion- Definition and examples of ammonotelism, ureotelism, uricotelism and gaunotelism; Ornithine cycle, nitrogen excretion in relation to water economy, physiology of urine formation in man.	**07.07.2018**
04.	**Neurophysiology**: Structure of multipolar neuron,Types of neurons and neuro-synapses, Membrane potentials (resting and action), Axonic and synaptic transmission of nerve impulses. **Muscle Physiology**: Types of muscles- Morphological (Striated and non-striated) and functional (voluntary and involuntary); Structure and mechanism of contraction of skeletal muscle (Initiation, contractile and regulatory proteins, sliding filament theory, energy for contraction), neuro-muscular junction.	**14.07.2018**
05.	**Gametogenesis:** Spermatogenesis – formation of spermatids, spermiogenesis. Oogenesis, type of eggs – based on quantity and distribution of yolk with examples. Egg membranes. **Fertilization:** Details of the process with reference to sea urchin – approach of gametes, role of fertilizin and antifertilizin, gamones and their role, activation, penetration, reaction of the egg and amphimixis, monospermy and polyspermy (physiological and pathological), significance of fertilization.	**28.07.2018**
06.	**Parthenogenesis:** Cytology of natural parthenogenesis – arrhenotoky, thelytoky (amictic and apomictic) and cyclical parthenogenesis with examples,; Artificial parthenogenesis – Loeb's and Bataillon's experiments, Significance of parthenogenesis, a brief notecloning.	**12.08.2018**

07.	**Cleavage:** Types of cleavage – holoblastic, meroblastic, radial, spiral and superficial types with examples; Planes of cleavage – meridonal, vertical, equatorial and latitudinal. **Development of frog:** Cleavage, blastula, gastrulation, neurulation, fatemaps; Organizer phenomenon – definition, Experiment of Spemann and Mangold, Potencies of the dorsal lip of the blastopore of amphibian gastrula; Definitions of competence, determination and differentiation	**26.08.2018**
08.	**Development of chick:** Structure of hen's egg, cleavae, blastula, gastrulation – origin and development of primitive streak; **Foetal Membranes:** Development, structure and functions of amnion, chorion, yolk sac and allantois. **Placenta:** Histological and morphological classification with examples. Placental hormones.	**06.092018**
09.	**Human Development:** Structure of mature spermatozoan, Graafian follicle, ovulation, fertilization, morula, blastocyst, implantation, gastrulation; Organogenesis – outlines of derivatives of different germ layers.	**20.09.2018**
10.	**Revision**	**17.10.2018**

III SEMESTER: ZOOLOGY

DSC 1C : PRACTICAL ANIMAL PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY

4hr /week X 16=64 hr

Sl.No.	Particulars	Datesfor 2018-19
01.	Salivary amylase activity assay.	**16.06.2018**
02.	Dehydrogenase activity assay in milk.	**23.06.2018**
03.	Estimation of proteins by colorimetric method- Biuret method.	**30.06.2018**
04.	Detection of nitrogenous excretory wastes in the given samples: Ammonia- Nessler's reagent test, Urea- Urease test and Uric acid- Folin's test.	**07.07.2018**
05.	Detection of abnormal excretion of glucose, albumin and creatinine in human urine. Glucose- Benedict's test, albumin- Heller's ring test, Creatinine- Jaffe's test.	**14.07.2018**
06.	Blood typing- A, B, AB, O and Rh factors in given human blood samples using antisera. Preparation of haematin crystals.	**21.07.2018**
07.	Analysis of amino acids by Paper chromatography- demonstration.	**28.07.2018**
08.	Total RBC count, differential count of WBC, Hb count, clotting time- Demonstration.	**04.08.2018**
09.	Electrophoresis- demonstration.	**11.08.2018**
10.	Identification of the sources of different fat soluble and water-soluble vitamins, their role and deficiency diseases (Sources have to be specified, avoiding overlapping ones).	**18.08.2018**
11.	Study of different types of eggs – Graafian follicle, frog's egg, hen's egg and insect egg. Study of grasshopper, frog and mammalian sperms.	**25.08.2018**
12.	Frog: cleavage stages, blastula (section), gastrula (yolk plug stage) and neurula (sections)	**01.09.2018**
13.	Chick embryo: 18 hrs. 24 hrs. 36 hrs. and 48 hrs (WM and sections).	**08.09.2018**
14.	Study of development - Hen's egg – window technique.	**15.09.2018**
15 & 16	Study of Developmental stages in *Drosophila* – egg, larva and pupa.	**22.09.2018**
17.	Revision	**17.10.2018**

V SEM ZOOLOGY

DSE 1A: BIOCHEMISTRY AND APPLIED ZOOLOGY (ELECTIVE 1)

4hr/weekX16=64 hr

Sl.No.	Particulars	Datesfor 2018-19
01.	**Carbohydrates**: Definition and classification: biological importance of monosaccharaides (glucose, fructose, ribose, deoxyribose), disachharides (sucrose, lactose, maltose), and polysachharides (homopolysachharides- starch, glycogen, dextrin and heteropolysachharides-heparin, chondrotin sulphate, hyaluronic acid, glucoronic acid).	**11.06.2018**
02.	**Proteins**: Elementary classification of amino acids: Simple and conjugated proteins with examples; Primary, secondary, tertiary and quaternary structure of proteins with haemoglobin as example, Biological importance of proteins.	**16.06.2018**
03.	**Lipids:** Defination and classification; biological importance of phospholipids, neutral lipids and Glycolipids; Clinical importance of lipids- lipid profile of blood.	**25.06. 2018**
04.	**Nucleic Acids**: Classification and structure of DNA and RNA. Watson and Crick model of DNA, cloverleaf model of t-RNA. **Enzymes:** Classification, properties, mechanism of enzyme action- induced fit theory; factors affecting enzyme action**,** Co enzymes and inhibitors**,** biological importance of enzymes. **Vitamins:** Classification; Source, importance, daily recommended dosage and deficiency diseases of fat soluble and water soluble vitamins.	**15.08.2018**
05.	Purposes and definitions of poultry, dairy, piggery, fishery, vermiculture, apiculture, pearl culture and aquaculture Sericulture: Morphology and life cycle of *Bombyx mori*, rearing up to cocoon stage, non- mulberry silkworms. Vermicultur**e:** Types of vermiculture**,** Different species of earthworms used for vermiculture. Composition of vermicompost and its importance. Culture practice of Indian major carps, Pearl formation.	**10.09.2018**
06.	**Pests, Parasites and Vectors** 1. Insects as pests – on food (cereals, pulses, coffee,) and vegetable (Cauli flower) crops . (One example for each with description of part of the plant affected and economic loss) 2.Parasitic protozoa (entamoeba), nematodesAnclyostoma), helminthes(tape worm) and their human diseases (symptoms of diseases, mode of transmission, control measures) 3.Vectors: Mosquitoes, ticks, mites, cockroaches, rat and their human diseases. (vector species, mode of transmission, control measures)	**15.09.2018**
07.	**Wild life** **a.** Uniqueness of Indian wildlife**,** Important fauna of Indian forests**;** **b.** Endangered, threatened, vulnerable, rare and extinct species (definitions with	**20.09.2018**

	examples), Red data book, green data book. **c.** Biodiversity hotspots- meaning, Salient features of biodiversity hotspots of India (number of plant and animal species, endemic species to be highlighted)	
08.	**Biostatics** Introduction – tabulation of data. Bar diagram, Histogram. Frequency distribution – mean, median and mode. Standard deviation and standard error. Chi-square test with problems.	**25.09 2018**
09.	**Revision**	**17.10.2018**

V SEM ZOOLOGY)
DSE 1A: PRACTICAL BIOCHEMISTRY AND APPLIED ZOOLOGY (ELECTIVE 1)
4hr/weekx16=64 hr

Sl.No.	Particulars	Datesfor 2018-19
01.	Qualitative tests to detect carbohydrates in the given test samples- Molisch's test, Iodine test, Fehling's test and Picric acid test.	**17.06.2018**
02.	Qualitative tests to detect proteins in the given test samples- Biuret test, Ninhydrin test, Millon's test and Xanthoproteic test.	**24.06.2018**
03.	Qualitative tests to detect lipids in the given test samples- Acrolin test, Sudan 3 test, Salkowasky test.	**01.07.2018**
04.	Detection of normal and abnormal constituents of urine.	**08.07.2018**
05.	Demonstration of Vermiculture in the laboratory or college campus.	**15.07.2018**
06.	Morphology and life history of *Bombyx mori*.	**22.07.2018**
07.	Identification and uses of different equipment in silkworm rearing.	**30.07.2018**
08.	Morphology of different species of locally available honey bee species and enlisting their foraging plants	**06.08.2018**
09.	Identification of different local food fishes (any five).	**12.08.2018**
10.	Collection of data such as height, weight, blood groups, etc. among students and calculation – mean, standard deviation and errors,. Construction of graph, histograms and bar diagrams using data obtained. (A minimum of two sets of data for each of statistical calculation)	**19.08.2018**
11.	Field oriented projects – to be changed every year: i) Visit to Vermiculture farm/silkworm rearing center /Fish farm/ Dairy/ Poultry/ Zoo/ wildlife sanctuary for on the spot study of culture practice and a report to be submitted .	**12.09.2018**
12.	ii) Enlisting different invertebrate/vertebrate fauna in the college campus/ town/ nearby hill/farms. Study may focus on particular group eg. birds, reptiles, insects, etc. A detailed report on their taxonomic position, habitat preference etc. has to be prepared. Two reports, one from each section has to be submitted for assessment.	**25.09.2018**
13.	**Revision**	**17.10.2018**

II SEMESTER: ZOOLOGY

DSC 1B: ANIMAL DIVERSITY 2 4hr/week=64hr

Sl.No	Particulars	Datesfor 2018-19
01.	Chordata- General characters and classification up to classes with examples;,concept of protochordata. Hemichordata- General characters, Balanoglossus- externals, proboscis complex, Tornaria larva; Affinities of Hemichordata with Annelida, Echinodermata and Chordata.	**20.12.2018**
02.	Cephalochordata- Amphioxus- externals, feeding mechanism, digestive and circulatory system; Urochordata- Ascidia- externals and brief description of internal morphology, larva and metamorphosis. Cyclostomata: Salient features of Petromyzon, Ammocoetes larva and its significance	**04.01.2019**
03.	Vertebrata**:** General characters and classification with examples Pisces **–** General characteristics of fishes; Differences between Chondrichthyes and Osteichthyes; Type study: *Scoliodon*- Morophology, respiratory and lateral line systems; Scales in fishes, Salient features and discontinuous distribution of Dipnoi.	**18.01.2019**
04.	Amphibia**:** General characters and classification up to orders, distinguishing features of living amphibians with suitable examples; Type study-Frog: Externals, digestive, respiratory, circulatory and urinogenital systems. Reptilia: General characters and classification up to orders with suitable examples; Temporal fossae and arcades in reptiles and their significance; Indian snakes - poisonous and nonpoisonous, poison apparatus, key for identification of nonpoisonous and poisonous snakes.	**06.02.2019**
05.	**Aves:** General characters and classification up to sub classes, *Archaeopteryx*- evolutionary significance, Distinctive features of Archaeornithes and Neornithes - Palaeognathae, Impennae and Neognathae with suitable examples; Flight Adaptations in birds - morphological, anatomical and physiological; Bird migration- preparation, causes, pattern, navigation, mechanics, orientation and advantages	**19.02.2019**
06.	**Mammalia:** General characters and classification up to subclasses; Distinctive features of prototheria, metatheria and eutheria with important examples; Affinities of prototheria;. **Type study**- Rabbit**:** Externals, digestive, respiratory,	**28.02.2019**

	circulatory and urinogenital systems.	
07.	Important characters and distribution with examples – Primates, Chiroptera, Cetacea, Perissodactyla, Artiodactyla, Carnivora, Rodentia and Proboscidia; Dentition in mammals – tooth structure, types, specialization and dental formula in Carnivora (cat, dog), Rodentia (rat), Proboscidia (elephant), Artiodactyla (Horse), Perissodactyla (cow) and Primates (man and monkey).	**06.03.2019**
08.	**Comparative anatomy**: Comparative anatomy of heart- Pisces (Shark), Amphibia (frog), Reptilia (Garden lizard) Aves (pigeon), Mammalia (man); Evolution of brain in vertebrates-brain of shark, frog, varanus, pigeon and man; Evolution of kidney in vertebrates - pronephros (Pisces –shark), mesonephros (Amphibia- frog), Metanephros (Reptilia - garden lizard), Aves(pigeon) and Mammalia (man); Aortic arches in vertebrates.	**23.03.2019**
09	**Revision**	**10.04.2019**

II SEMESTER :ZOOLOGY

DSC 1B: PRACTICAL ANIMAL DIVERSITY 2 4hr/weekx16=64hr

Sl.No.	Particulars	Dates for 2018-19
01.	**Hemichordata:** Balanoglossus, T.S. through proboscis, collar, branchio-genital region. **Urochordata:** Ascidia **Cephalochordata:** Amphioxus, T.S. through pharynx and intestine.	**22.12.2018**
02.	Cyclostomata: Petromyzon, Ammocoetes larva, Myxine.	**29.12.2018**
03.	Fishes: Scoliodon, Zygaena, Pristis, Narcin, Trygon.: Echeinis, Hippocampus, Anguilla.	**12.01.2019**
04.	Slide preparation :placoid, cycloid and ctenoid scales.	**19.01.2019**
05.	Amphibia: Ichthyophis. Salamander, Axolotl larva, Rana,	**26.01.2019**
06.	Reptilia: Varanus, Chelone, cobra, Viper, Krait,, sea snake, Rat snake.	**02.02.2019**
07.	Aves: Kingfisher, Parakeet, Woodpecker, Crow, Owl, Duck. Structure of a quill feather.	**09.02.2019**
08.	Mammalia: Rabbit, Rat, Bat, Loris.	**18.02.2019**
09.	Osteology: Skulls of shark, Frog and Crocodile.	**23.02.2019**
10.	Osteology: Skulls of Pigeon and Rabbit.	**02.03.2019**
11.	Osteology: Vertebrae (atlas, pro, amphi, and acoelous) of frog, Pigeon (heterocoelous andsynsacrum) and Rabbit (atlas, axis and thoracic)	**09.03.2019**
12.	Osteology: Pectoral girdles and forelimb skeletons of Frog, Pigeon and Rabbit. Pelvic girdles and hindlimbs of Frog, Pigeon and Rabbit.	**16.03.2019**
13.	Bird watching: Preparation and submission of checklist of birds in the campus/ nearby places.	**30.03.2019**
14.	Study of internal systems (digestive, circulatory, nervous and excretory) of Frog/ rat.	**05.04.2019**
15.	Revision	**10.04.2019**

IV SEMESTER : ZOOLOGY

DSC 1D: CELL BIOLOGY AND GENETICS 4hr/week x16=64hr

Sl.No.	Particulars	Dates for 2018-19
01.	The Cell: Ultrastructure of an animal cell.	**14.12.2018**
02.	Membrane system: Plasma membrane: Ultrastructure – fluid mosaic model, functions. Endoplasmic reticulum: Ultrastructure, types, origin and functions. Golgi complex: Occurrence, morphology, origin and functions. Lysosome: Occurrence, structure, enzymes, polymorphism, functions.	**25.12.2018**
03.	1. Mitochondria: Morphology, distribution, ultrastructure and functions; Mitochondria as semi-autonomous organelles. 2. Ribosomes: Occurrence, distribution, types, chemical composition, dissociation and reconstitution	**10.01.2019**
04.	1. Nucleus: Ultrastructure of nucleus, nuclear membrane, nucleoplasm and chromatin fibres; Ultrastructure and functions of nucleolus. 2. Chromosome: Morphology and ultrastructure (nucleosome model) and chemical composition, number, size; Karyotype and idiogram; euchromatin and heterochromatin;types of heterochromatin; Giant chromosomes-polytene and lampbrush chromosomes; Chromosomal aberrations – deletion, duplication, inversion and translocation.	**24.01.2019**
05.	1.Cell division: Mitosis: Cell cycle, mitotic stages, ultrastructure of centriole spindle fibre and its role in chromosome movements. Significance of mitosis, mitotic inhibitors; Meiosis: Stages of meiosis. Synaptonemal complex, chiasma formation, mechanism of crossing over.	**02.02.2019**
06.	1.Gene and Protein synthesis: Gene concept: cistron, recon and muton – definitions' Jumping genes or transposable genes – Barbara McClintock's work on maize, Characteristics of jumping genes, Split genes; Control of gene expression – Lac Operon; Genetic code: properties of genetic code, Transcription in prokaryotes – RNA polymerase, binding, initiation, elongation and termination; Post-transcriptional modification of mRNA – addition of cap, tail and RNA splicing – introns, exons and ribozymes; Translation in prokaryotes – aminoacylation of tRNA, elongation, termination	**18.02.2019**
07.	**Nature and Nurture:** Definition. Experiments on Potentillaglandulosa, Himalayan albino rabbit andHuman twins; Definition of norm of reaction, genetic homeostasis, phenocopy, penetrance and expressivity with examples – Huntington's chorea, PTC; Mendel's laws, Mono and dihybrid crosses. Incomplete dominance – flower colour inheritance in *Mirabilis jalapa*, Cytoplasmic (maternal) inheritance – shell coiling in Limnaea.	**02.03.2019**
08.	**Interaction of genes:** Supplementary factors–9:3:3:1(comb pattern in fowls) Dominant epistasis – 13:3 (plumagecolour in Leghorn and Wyandotte) Complimentary factors – 9:7 (flower colour in sweet peas) Multiple factors/ polygenic inheritance – (skin colour in man) Lethal genes – yellow coat colour in mice; Multiple Alleles: ABO blood groups in man; Isoalleles (Lozenze eye in *Drosophila*), pseudoalleles (Rh factor) and position effect (aristopedia in *Drosophila*.);Pleiotropism (Phenylketoneuria in Man and vestigial wing in *Drosophila*).	**16.03.2019**

09.	**Linkage and crossing over**: complete and incomplete linkage in*Drosophila*(grey body and vestigialwing). Significance of crossing over; **Genetic maps of chromosomes**: construction of chromosome maps, three-point test cross in Drosophila(sc,ec,cv): **Sex linked inheritance:** Sex linked inheritance in *Drosophila* and man, Haemophiliaandcolour blindness in man. Sex linkage in poultry. Y-linked genes; **Sex determination**: Chromosomal basis of sex determination, Non-disjunction:primary and secondary, Genic balance theory. Gynandromorphs and intersexes in *Drosophila*, Klinefelter's and Turner's Syndromes. Environmental effect (Bonellia) and hormonal effects (Free Martin in cattles) on determination of sex.	**28.03.2019**
10.	**1.Gene mutation : Point mutation** –definition with example of sickle cell anemia, Types of mutations,direction magnitude of phenotypic effect. **Disorders due to mutant genes in man**: Sickle cell anemia, thalassemia. Inborn errors of metabolism; phenylketonuria, alkaptoneuria, albinism. Mutagens, CIB technique for detection of sex-linked mutations, Practical application and significance. **2.Human Genetics:** Eugenics, euthenics and euphenics; Human genomics – definition and brief account on its usefulness to mankind.	**05.04.2019**
11.	**Revision**	**10.04.2019**

IV SEMESTER ZOOLOGY
DSC 1D: PRACTICAL CELL BIOLOGY AND GENETICS
4 hr/week x16=64 hrs

Sl.No.	Particulars	Dates for 2018-19
01.	Micrometry: Use of ocular and stage micrometers to measure cell and nuclear dimensions.	**22.12.2018**
02.	Study of permanent slides of different stages of mitosis in onion root tip.	**29.12.2018**
03.	Squash preparation of onion root tip to study stages of mitosis.	**12.01.2019**
04.	Study of permanent slides of various stages of meiosis in grasshopper testis.	**19.01.2019**
05.	Demonstration of squash preparation of grasshopper testis to study stages of meiosis.	**02.02.2019**
06.	Study of permanent slides of salivary gland chromosomes of *Drosophila.* Squash preparation of salivary gland chromosomes of *Drosophila* / Chironomous larva.	**16.02.2019**
07.	Study of permanent slide/ karyotype and idiogram of man	**23.02.2019**
08.	Preparation of karyotype from the given metaphase plate of *Drosophila* / Grasshopper.	**02.03.2019**
09.	Genetics problems a)Monohybrid inheritance – 1 animal (*Drosophila*) example. b)Dihybrid inheritance – 1 animal (*Drosophila*) example. c)Complementary genes – flower colour in Sweet pea d)Supplementary genes – comb pattern in Fowls. e)Epistatic (inhibitory) genes – plumage colour in Flowls. f) Multiple genes – Skin colour in Man.	**09.03.2019**
10.	a)Multiple alleles – ABO blood group in Humans (1 problem) b)Sex-linked inheritance in *Drosophila* (2) and in humans (2). c) Chromosomal abnormalities in Humans – Turner's, Klinefelter's and Down's syndromes (Chromosomal compliments and photos)	**16.03.2019**
11.	Construction of 3-point test cross linkage map (2 problems).	**23.03.2019**
12.	General morphology of *Drosophila* and mounting of sex comb and wing.	**30.03.2019**
13.	Identification of wild (male and female) and different types of mutants in *Drosophila* – white eye, bar eye, sepia eye, vestigial wing and yellow body.	**06.04.2019**
14.	Revision	**10.04.2019**

DSE 1B: ENVIRONMENTAL BIOLOGY (ELECTIVE 2)

4hr/weekX16=64 hr

Sl.No.	Particulars	Dates for 2018-19
01.	**Ecology** – Definition, sub-divisions and scope; **Environment** – Types: composition and strata of Atmosphere, hydrosphere and lithosphere; **Ecological factors**: Abiotic and biotic; **Abiotic factors** – light, temperature (thermal stratification), topographic(latitudes and altitudes); **Biotic factors** – Animal relationships with relevant examples: Intra specific- co-action, aggregation and competition, Gause's principle; Interspecific: positive interaction – mutualism, commensalism, protocooperation; negative interactions – parasitism, predation, and competition.	**31.12.2018**
02.	**1. Biogeochemical Cycles and Food chain** Definition, complete and incomplete cycles, Nitrogen and phosphorous cycles Food chains: types of food chains with examples and food web with examples. Ecological pyramids (number, biomass and energy) with examples. Energy – energy flow and laws of thermodynamics. **2. Population and Community Ecology:** Population ecology – Density – Natality and Mortality, age distribution. Community ecology – types of communities and community structure, bio-indicators of aquatic ecosystem, ecotone and edge effect. Ecological succession – basic types - primary and secondary, climax community.	**22.01.2019**
03.	**Ecosystem** Concept, types and structure of ecosystem, natural, human engineered and micro – ecosystems. **Fresh water ecosystem** –physico-chemical nature of fresh water. Lentic and lotic ecosystems withexamples. The tropical pond as an ecosystem – abiotic components, producers, consumers and decomposers, interaction between components. **Terrestrial ecosystem** –physico-chemical nature, soil profile, classification, biomes: forest, grassland**,** desert, and characteristic fauna.	**11.02.2019**
04.	**Environmental Pollution** Definition and types – air, water, soil and sound pollutions. Sources, effects and control of air, and water pollution with special mention of greenhouse effect, ozone depletion, photochemical smog, acid rain, stone leprosy. Ganga river pollution, mass death of fishes in lakes,; Legislation for environment protection in India, Pollution control board in Karnataka-functions	**06.03.2019**
05.	**Zoogeography and Wild life conservation** **Zoogeographical realms** and their characteristic fauna. Detailed account of fauna of oriental region, abrief account of Wallace's line. **Wildlife Depletion**: Hunting, over-harvesting, developmental activities **Wildlife Conservation**: conservation strategies (*in situ*and*ex situ*), agencies engaged in wildlifeconservation, Government organizations and non-government organizations (NGOs). Wildlife (Protection) Act 1972, CITES (Convention on International Trade in Endangered Species of wildlife flora and fauna), Endangered fauna of India, Red data book.	**30.03.2019**
06.	**Revision**	**10.04.2019**

V I SEM ZOOLOGY
DSE 1B: PRACTICAL ENVIRONMENTAL BIOLOGY (ELECTIVE 2)

4hr/week x16 = 64 hr

Sl.No.	Particulars	Dates for 2018-19
01.	Collection of water samples from different sources (pond, river, ground water, etc.) and recording color, odour,pH and temperature.	**22.12.2018**
02.	Estimation of dissolved oxygen in two water samples.	**29.12.2018**
03.	Estimation of BOD in two water samples (sewage and tapwater/river water)	**05.01.2019**
04.	Estimation of dissolved carbon dioxide in two water samples.	**12.01.2019**
05.	Estimation of chloride content in two water samples.	**19.01.2019**
06.	Estimation of hardness of two water samples.	**26.01.2019**
07.	Study of pond ecosystem – observation of various constituents, plankton, faunaand flora.	**02.02.2019**
08.	Study of artificial ecosystem-aquarium	**09.02.2019**
09.	Study of garden soil fauna using Berlesse funnel apparatus.	**16.02.2019**
10.	Positive animal interactions: Mutualism – Termite and Trichonympha,Commensalism– Echeineis and Shark, Proto co-operation – Hermit crab and Sea anemone.	**02.03.2019**
11.	Negative animal interactions: Parasitism – Head louse, Bedbug, Female mosquito, Ticks and mites. Predation – Snake and Frog.	**09.03.2019**
12.	Field visits to assess the pollution status of water bodies based onodour, water colour, release of sewage etc. Solid waste accumulation and disposal status /collection of data onair pollution from different agencies and preparation of report.	**23.03.2019**
13.	Revision	**10.04.2019**

॥ **JAI SRI GURUDEV** ॥

LESION PLAN FOR B.SC. (CBCS) ZOOLOGY COURSE FOR THE ACADEMIC YEAR 2019-20

SUBJECT: ZOOLOGY
I SEMESTER: ZOOLOGY
DSC 1A: Animal Diversity-1 4 hr/ week X 16=64 hrs

Sl.No	Particulars	Dates for 2019-20	Methodology /pedagogy
2.	Nonchordata-outlines of animalclassification. five kingdom concept, Binomial nomenclature, Definition of species Nonchordata-outlines of animalclassification.	14.06.2019	Black board /group discussion
2.	Protozoa: General characters and classification up to classes with examples; Locomoti (amoeboid, flagellar and ciliary- excluding theories) and reproduction (fission and conjugation); Plasmodium: Morphology, life cycle, pathogenicity and preventive measures of *Plasmodium vivax*	27.06.2019	Black board /group discussion
3.	Concept of Metazoa; Levels of organization - Cell, tissue, organ, organ system (Definition with examples); Porifera: General characters with classification up to classes with examples; Sponge spicules, canal system (Ascon, Sycon, leucon, rhagon) and larvae amphiblastula and parenchymula)	9.07.2019	Black board /group discussion
4.	Cnidaria: General characters and classification up to classes with examples; Polymorphism in cnidaria- Obelia and Halistemma, Structure of corallite, types of coral reefs, importance of corals. Acnidaria: Salient features and systematic position of Ctenophora.	24.07.2019	Black board /group discussion
5.	Concept of coelom: Acoelom, Pseudocoelom, Eucoelom (Definition with examples). Helminthes Platyhelminthes: General characters and classification up to classes with examples; *Taenia solium* - Life cycle, pathogenicity and preventive measures. Aschelminthes: General characters and examples; morphology, transmission, pathogenicity and preventive measures of *Ascaris ,Ancyclostoma* and *Wucheraria*. Parasitic adaptations in helminthes.	10.08.2019	Black board /group discussion
6.	Annelida: General characters and classification up to classes with examples. Type study: i) Pheretima- Morphology, setae, digestive, circulatory, excretory (nephridium), nervous and reproductive systems, Trochophore larva and its significance; ii). Leech- Morphology and parasitic adaptations; iii) Tubiculous worms- tubiculous adaptations in *Nereis* and *chaetopterus*.	24.08.2019	Black board /group discussion
7.	Onychophora: Salient features of *Peripatus* and systematic position of Onychophora. Arthropoda : General characters and classification up to classes with examples, Type study- Cockroach- Morphology, digestive, respiratory and nervous systems; direct	07.09.2019	Black board /group discussion

	and indirect development in insects- description with examples; harmful and beneficiary insects- brief general account with examples; social organization in insects (Terminte).		
8.	Mollusca: General characters and classification with examples; Type study- Fresh water Mussel- morphology, digestive, respiratory and nervous systems; foot in mollusca, Diversity in Molluscan shells .	17.09.2019	Black board /group discussion
9.	Echinodermata: General characters and classification with examples; Type study- Star fish-morphology and water-vascular system; echinoderm larvae and their phylogenetic significance.	26.09.2019	Black board /group discussion
10.	Regenerative ability in invertebrates; Symmetry in invertebrates (Cell aggregates, blind sac,tube within tube).	03.10.2019	Black board /group discussion
11.	Revision	14.10. 2019	Black board /group discussion

Sl.No	Particulars	Datesfor 2019-20	
01.	A) Study of Microsope. B) Study of permanent slides of protozoa: Amoeba, Entamoeba, Polystomella. Euglena, Paramecium, Balantidum,Vorticella.	**22.06.2019**	Black board /group discussion
02.	Preparation of protozoan culture by students and observation of protozoan culture	**29.06.2019**	Black board /group discussion
03.	Porifera: Study of slides/specimens –Sycon, Spongilla, Euspongia,Sponge gemmule, Monaxon spicules.	**06.07.2019**	Black board /group discussion
04.	Cnidaria: Hydra, Physalia, Aurelia, Ephyra larva, Metridium, Gorgonia, Madrepora Pennatula, Corallium rubrum, Fungia,Favia,Meandrina.	**13.07.2019**	Black board /group discussion
05.	Helminthes: Planaria, Fasciola, Taenia, Ascaris-male and female Scolex of Taenia,T.S. of Taenia and Ascaris (male or female)	**20.07.2019**	Black board /group discussion
06.	Annelida: Pheritima, Nereis, Chaetopterus, Aphrodite. Leech, T.S of Nereis and Leech	**27.07.2019**	Black board /group discussion
08.	Temporary slide preparation of whole mounts of coelenterate colonies: Obelia, Sertularia,Bougainvillea, companularia , pennaria (any four)/Observation of permanent slides.	**03.08.2019**	Black board /group discussion
09.	Onychophora: Peripatus,Arthropoda : Panaeus, Nauplius larva, Mysis larva. Scolopendra, Spirostreptus, Palamnaeus, Aranea,	**10.08.2019**	Black board /group discussion
10.	Field study: Observation of Arthropods in and around the college campus, identifying and recording in the practical record (Minimum five insects).	**17.08.2019**	Black board /group discussion
11.	Taxonomic study of insects up to orders giving key for identification, selecting any five locally available common examples and recording them.	**24.08.2019**	Black board /group discussion
12.	Study of Arthropodan pests: Periplaneta, Rhinicerous beetle, Termite and Weevil. Study of Arthropodan vectors: Culex, Aedes, Anopheles mosquitoes and house fly.	**31.08.2019**	Black board /group discussion
13.	Study of mouth parts of insects: Cockroach, female mosquito, house fly, and honey bee (permanent slides).	**07.09.2019**	Black board /group discussion

14.	Cockroach: Study of digestive system and nervous system.	**14.09.2019**	Black board /group discussion
15.	Mollusca: Chiton, Dentallium shell, Xancus shell, Aplysia, Unio, Octopus.	**21.09.2019**	Black board /group discussion
16.	Echinodermata: - Astropecten, Ophiothrix, Salmacis, Holothuria. Echinodermata: Antedon, Bipinnaria larva, Pluteus larva, Pedicellaria of sea urchin.	**28.09.2019**	Black board /group discussion
17.	Reversion	**14.10.2019**	Black board /group discussion

I SEMESTER: ZOOLOGY

DSC 1A: I SEMESTER: ZOOLOGY 4 hrs/week x16= 64 hrs

Sl.No	Particulars	Datesfor 2019-20	
01.	**Homeostasis:** Definition and significance, water, glucose and salt balance. Osmoregulation: Osmoconformers and osmoregulators, osmoregulation in shark, marine and freshwater teleosts, terrestrial mammals (Kangaroo rat and Camel). **Thermoregulation:** Effects of temperature change- Q 10 effect, Causes of thermal deaths;Definition of ectotherm, endotherms, poikilotherms, and homeotherms, Heterotherms; Temperature compensation in poikilotherms and homeotherms; A note on aestivation and hibernation.	**21.06.2019**	Black board /group discussion
02.	**Digestion:** Hunger and apetite; digestion and absorption of carbohydrates, proteins and lipids. **Respiration:** Physiology of respiration – exchange of gases; Transport of oxygen, oxygen dissociation curve-Bohr's effect, Transport of carbon dioxide – chloride shift, respiratory quotient; Cellular respiration: Glycolysis, Kreb's cycle, oxidative phosphorylation, energy budget.	**05.07.2019**	Black board /group discussion
03.	**Circulation:** Structure and functions of human heart, regulation of heart beat, blood pressure, Mechanism of blood clotting. **Nitrogen Excretion:** Types of nitrogen excretion- Definition and examples of ammonotelism, ureotelism, uricotelism and gaunotelism; Ornithine cycle, nitrogen excretion in relation to water economy, physiology of urine formation in man.	**18.07.2019**	Black board /group discussion
04.	**Neurophysiology**: Structure of multipolar neuron,Types of neurons and neuro-synapses, Membrane potentials (resting and action), Axonic and synaptic transmission of nerve impulses. **Muscle Physiology**: Types of muscles- Morphological (Striated and non-striated) and functional (voluntary and involuntary); Structure and mechanism of contraction of skeletal muscle (Initiation, contractile and regulatory proteins, sliding filament theory, energy for contraction), neuro-muscular junction.	**31.07.2019**	Black board /group discussion
05.	**Gametogenesis:** Spermatogenesis – formation of spermatids, spermiogenesis. Oogenesis, type of eggs – based on quantity and distribution of yolk with examples. Egg membranes. **Fertilization:** Details of the process with reference to sea urchin – approach of gametes, role of fertilizin and antifertilizin, gamones and their role, activation, penetration, reaction of the egg and amphimixis, monospermy and polyspermy (physiological and pathological), significance of fertilization.	**29.07.2019**	Black board /group discussion
06.	**Parthenogenesis:** Cytology of natural parthenogenesis – arrhenotoky, thelytoky (amictic and apomictic) and cyclical parthenogenesis with examples,; Artificial parthenogenesis – Loeb's and Bataillon's experiments, Significance of parthenogenesis, a brief notecloning.	**12.08.2019**	Black board /group discussion
07.	**Cleavage:** Types of cleavage – holoblastic, meroblastic, radial, spiral and superficial types with examples; Planes of cleavage – meridonal, vertical, equatorial and latitudinal. **Development of frog:** Cleavage, blastula, gastrulation, neurulation, fatemaps; Organizer phenomenon – definition, Experiment of Spemann and Mangold, Potencies of the dorsal lip of the blastopore of amphibian gastrula; Definitions of competence, determination and differentiation	**26.08.2019**	Black board /group discussion
08.	**Development of chick:** Structure of hen's egg, cleavae, blastula, gastrulation – origin and development of primitive streak;	**15.092019**	Black board

	Foetal Membranes: Development, structure and functions of amnion, chorion, yolk sac and allantois. **Placenta:** Histological and morphological classification with examples. Placental hormones.		/group discussion
09.	**Human Development:** Structure of mature spermatozoan, Graafian follicle, ovulation, fertilization, morula, blastocyst, implantation, gastrulation; Organogenesis – outlines of derivatives of different germ layers.	**27.09.2019**	Black board /group discussion
10.	**Revision**	**14.10.2019**	

III SEMESTER: ZOOLOGY

DSC 1C : ANIMAL PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY 4hr /week X 16=64 hr

III SEMESTER: ZOOLOGY

DSC 1C : PRACTICAL ANIMAL PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY

4hr /week X 16=64 hr

Sl.No.	Particulars	Datesfor 2019-20
01.	Salivary amylase activity assay.	**22.06.2019**
02.	Dehydrogenase activity assay in milk.	**29.06.2019**
03.	Estimation of proteins by colorimetric method- Biuret method.	**06.07.2019**
04.	Detection of nitrogenous excretory wastes in the given samples: Ammonia- Nessler's reagent test, Urea- Urease test and Uric acid- Folin's test.	**13.07.2019**
05.	Detection of abnormal excretion of glucose, albumin and creatinine in human urine. Glucose- Benedict's test, albumin- Heller's ring test, Creatinine- Jaffe's test.	**20.07.2019**
06.	Blood typing- A, B, AB, O and Rh factors in given human blood samples using antisera. Preparation of haematin crystals.	**27.07.2019**
07.	Analysis of amino acids by Paper chromatography- demonstration.	**03.08.2019**
08.	Total RBC count, differential count of WBC, Hb count, clotting time- Demonstration.	**10.08.2019**
09.	Electrophoresis- demonstration.	**17.08.2019**
10.	Identification of the sources of different fat soluble and water-soluble vitamins, their role and deficiency diseases (Sources have to be specified, avoiding overlapping ones).	**24.08.2019**
11.	Study of different types of eggs – Graafian follicle, frog's egg, hen's egg and insect egg. Study of grasshopper, frog and mammalian sperms.	**31.08.2019**
12.	Frog: cleavage stages, blastula (section), gastrula (yolk plug stage) and neurula (sections)	**07.09.2019**
13.	Chick embryo: 18 hrs. 24 hrs. 36 hrs. and 48 hrs (WM and sections).	**14.09.2019**
14.	Study of development - Hen's egg – window technique.	**21.09.2019**
15 & 16	Study of Developmental stages in *Drosophila* – egg, larva and pupa.	**28.09.2019**
17.	Revision	**14.10.2019**

V SEM ZOOLOGY

DSE 1A: BIOCHEMISTRY AND APPLIED ZOOLOGY (ELECTIVE 1)

4hr/weekX16=64 hr

Sl.No.	Particulars	Datesfor 2019-20
01.	**Carbohydrates**: Definition and classification: biological importance of monosaccharaides (glucose, fructose, ribose, deoxyribose), disachharides (sucrose, lactose, maltose), and polysachharides (homopolysachharides- starch, glycogen, dextrin and heteropolysachharides-heparin, chondrotin sulphate, hyaluronic acid, glucoronic acid).	**29.06.2019**
02.	**Proteins**: Elementary classification of amino acids: Simple and conjugated proteins with examples; Primary, secondary, tertiary and quaternary structure of proteins with haemoglobin as example, Biological importance of proteins.	**20.07.2019**
03.	**Lipids:** Defination and classification; biological importance of phospholipids, neutral lipids and Glycolipids; Clinical importance of lipids- lipid profile of blood.	**10.08. 2019**
04.	**Nucleic Acids**: Classification and structure of DNA and RNA. Watson and Crick model of DNA, cloverleaf model of t-RNA. **Enzymes:** Classification, properties, mechanism of enzyme action- induced fit theory; factors affecting enzyme action**,** Co enzymes and inhibitors**,** biological importance of enzymes. **Vitamins:** Classification; Source, importance, daily recommended dosage and deficiency diseases of fat soluble and water soluble vitamins.	**22.08.2019**
05.	Purposes and definitions of poultry, dairy, piggery, fishery, vermiculture, apiculture, pearl culture and aquaculture Sericulture: Morphology and life cycle of *Bombyx mori*, rearing up to cocoon stage, non- mulberry silkworms. Vermicultur**e:** Types of vermiculture**,** Different species of earthworms used for vermiculture. Composition of vermicompost and its importance. Culture practice of Indian major carps, Pearl formation.	**07.09.2019**
06.	**Pests, Parasites and Vectors** 1. Insects as pests – on food (cereals, pulses, coffee,) and vegetable (Cauli flower) crops . (One example for each with description of part of the plant affected and economic loss) 2.Parasitic protozoa (entamoeba), nematodesAnclyostoma), helminthes(tape worm) and their human diseases (symptoms of diseases, mode of transmission, control measures) 3.Vectors: Mosquitoes, ticks, mites, cockroaches, rat and their human diseases. (vector species, mode of transmission, control measures)	**17.09.2019**
07.	**Wild life** **a.** Uniqueness of Indian wildlife**,** Important fauna of Indian forests**;** **b.** Endangered, threatened, vulnerable, rare and extinct species (definitions with examples), Red data book, green data book. **c.** Biodiversity hotspots- meaning, Salient features of biodiversity hotspots of India (number of plant and animal species, endemic species to be highlighted)	**28.10.2019**

08.	**Biostatics** Introduction – tabulation of data. Bar diagram, Histogram. Frequency distribution – mean, median and mode. Standard deviation and standard error. Chi-square test with problems.	**05.10. 2019**
09.	**Revision**	**14.10.2019**

V SEM ZOOLOGY)

DSE 1A: PRACTICAL BIOCHEMISTRY AND APPLIED ZOOLOGY (ELECTIVE 1)

4hr/weekx16=64 hr

Sl.No.	Particulars	Datesfor 2019-20
01.	Qualitative tests to detect carbohydrates in the given test samples- Molisch's test, Iodine test, Fehling's test and Picric acid test.	**22.06.2019**
02.	Qualitative tests to detect proteins in the given test samples- Biuret test, Ninhydrin test, Millon's test and Xanthoproteic test.	**28.06.2019**
03.	Qualitative tests to detect lipids in the given test samples- Acrolin test, Sudan 3 test, Salkowasky test.	**06.07.2019**
04.	Detection of normal and abnormal constituents of urine.	**13.07.2019**
05.	Demonstration of Vermiculture in the laboratory or college campus.	**23.07.2019**
06.	Morphology and life history of *Bombyx mori*.	**30.07.2019**
07.	Identification and uses of different equipment in silkworm rearing.	**07.08.2019**
08.	Morphology of different species of locally available honey bee species and enlisting their foraging plants	**16.08.2019**
09.	Identification of different local food fishes (any five).	**24.08.2019**
10.	Collection of data such as height, weight, blood groups, etc. among students and calculation – mean, standard deviation and errors,. Construction of graph, histograms and bar diagrams using data obtained. (A minimum of two sets of data for each of statistical calculation)	**10.09.2019**
11.	Field oriented projects – to be changed every year: i) Visit to Vermiculture farm/silkworm rearing center /Fish farm/ Dairy/ Poultry/ Zoo/ wildlife sanctuary for on the spot study of culture practice and a report to be submitted .	**24.09.2019**
12.	ii) Enlisting different invertebrate/vertebrate fauna in the college campus/ town/ nearby hill/farms. Study may focus on particular group eg. birds, reptiles, insects, etc. A detailed report on their taxonomic position, habitat preference etc. has to be prepared. Two reports, one from each section has to be submitted for assessment.	**03.10.2019**
13.	**Revision**	**14.10.2019**

II SEMESTER: ZOOLOGY

DSC 1B: ANIMAL DIVERSITY 2 4hr/week=64hr

Sl.No	Particulars	Datesfor 2019-20
01.	Chordata- General characters and classification up to classes with examples;,concept of protochordata. Hemichordata- General characters, Balanoglossus- externals, proboscis complex, Tornaria larva; Affinities of Hemichordata with Annelida, Echinodermata and Chordata.	**31.10.2019**
02.	Cephalochordata- Amphioxus- externals, feeding mechanism, digestive and circulatory system; Urochordata- Ascidia- externals and brief description of internal morphology, larva and metamorphosis. Cyclostomata: Salient features of Petromyzon, Ammocoetes larva and its significance	**16.11.2019**
03.	Vertebrata**:** General characters and classification with examples Pisces **–** General characteristics of fishes; Differences between Chondrichthyes and Osteichthyes; Type study: *Scoliodon*- Morophology, respiratory and lateral line systems; Scales in fishes, Salient features and discontinuous distribution of Dipnoi.	**30.11.2019**
04.	Amphibia**:** General characters and classification up to orders, distinguishing features of living amphibians with suitable examples; Type study-Frog: Externals, digestive, respiratory, circulatory and urinogenital systems. Reptilia: General characters and classification up to orders with suitable examples; Temporal fossae and arcades in reptiles and their significance; Indian snakes - poisonous and nonpoisonous, poison apparatus, key for identification of nonpoisonous and poisonous snakes.	**18.12.2019**
05.	**Aves:** General characters and classification up to sub classes, *Archaeopteryx*- evolutionary significance, Distinctive features of Archaeornithes and Neornithes - Palaeognathae, Impennae and Neognathae with suitable examples; Flight Adaptations in birds - morphological, anatomical and physiological; Bird migration- preparation, causes, pattern, navigation, mechanics, orientation and advantages	**31.12.2019**
06.	**Mammalia:** General characters and classification up to subclasses; Distinctive features of prototheria, metatheria and eutheria with important examples; Affinities of prototheria;. **Type study**- Rabbit**:** Externals, digestive, respiratory, circulatory and urinogenital systems.	**16.01.2020**
07.	Important characters and distribution with examples – Primates, Chiroptera, Cetacea, Perissodactyla, Artiodactyla, Carnivora, Rodentia and Proboscidia;	**10.02.2020**

	Dentition in mammals – tooth structure, types, specialization and dental formula in Carnivora (cat, dog), Rodentia (rat), Proboscidia (elephant), Artiodactyla (Horse), Perissodactyla (cow) and Primates (man and monkey).	
08.	**Comparative anatomy**: Comparative anatomy of heart- Pisces (Shark), Amphibia (frog), Reptilia (Garden lizard) Aves (pigeon), Mammalia (man); Evolution of brain in vertebrates-brain of shark, frog, varanus, pigeon and man; Evolution of kidney in vertebrates - pronephros (Pisces –shark), mesonephros (Amphibia- frog), Metanephros (Reptilia - garden lizard), Aves(pigeon) and Mammalia (man); Aortic arches in vertebrates.	**15.03.2020**
09	**Revision**	**31.03.2020**

II SEMESTER :ZOOLOGY
DSC 1B: PRACTICAL ANIMAL DIVERSITY 2 4hr/weekx16=64hr

Sl.No.	**Particulars**	Dates for

		2019-20
01.	**Hemichordata:** Balanoglossus, T.S. through proboscis, collar, branchio-genital region. **Urochordata:** Ascidia **Cephalochordata:** Amphioxus, T.S. through pharynx and intestine.	**26.10.2019**
02.	Cyclostomata: Petromyzon, Ammocoetes larva, Myxine.	**02.11.2019**
03.	Fishes: Scoliodon, Zygaena, Pristis, Narcin, Trygon.: Echeinis, Hippocampus, Anguilla.	**09.11.2019**
04.	Slide preparation :placoid, cycloid and ctenoid scales.	**23.11.2019**
05.	Amphibia: Ichthyophis. Salamander, Axolotl larva, Rana,	**30.11.2019**
06.	Reptilia: Varanus, Chelone, cobra, Viper, Krait,, sea snake, Rat snake.	**10.12.2019**
07.	Aves: Kingfisher, Parakeet, Woodpecker, Crow, Owl, Duck. Structure of a quill feather.	**18.12.2019**
08.	Mammalia: Rabbit, Rat, Bat, Loris.	**25.12.2019**
09.	Osteology: Skulls of shark, Frog and Crocodile.	**04.01.2020**
10.	Osteology: Skulls of Pigeon and Rabbit.	**14.01.2020**
11.	Osteology: Vertebrae (atlas, pro, amphi, and acoelous) of frog, Pigeon (heterocoelous andsynsacrum) and Rabbit (atlas, axis and thoracic)	**26.01.2020**
12.	Osteology: Pectoral girdles and forelimb skeletons of Frog, Pigeon and Rabbit. Pelvic girdles and hindlimbs of Frog, Pigeon and Rabbit.	**04.02.2020**
13.	Bird watching: Preparation and submission of checklist of birds in the campus/ nearby places.	**20.02.2020**
14.	Study of internal systems (digestive, circulatory, nervous and excretory) of Frog/ rat.	**12.03.2020**
15.	Revision	**31.03.2020**

IV SEMESTER : ZOOLOGY
DSC 1D: CELL BIOLOGY AND GENETICS 4hr/week x16=64hr

Sl.No.	**Particulars**	Dates for

		2019-20
01.	The Cell: Ultrastructure of an animal cell.	**22.10.2019**
02.	Membrane system: Plasma membrane: Ultrastructure – fluid mosaic model, functions. Endoplasmic reticulum: Ultrastructure, types, origin and functions. Golgi complex: Occurrence, morphology, origin and functions. Lysosome: Occurrence, structure, enzymes, polymorphism, functions.	**31.10.2019**
03.	1. Mitochondria: Morphology, distribution, ultrastructure and functions; Mitochondria as semi-autonomous organelles. 2. Ribosomes: Occurrence, distribution, types, chemical composition, dissociation and reconstitution	**16.11.2019**
04.	1. Nucleus: Ultrastructure of nucleus, nuclear membrane, nucleoplasm and chromatin fibres; Ultrastructure and functions of nucleolus. 2. Chromosome: Morphology and ultrastructure (nucleosome model) and chemical composition, number, size; Karyotype and idiogram; euchromatin and heterochromatin;types of heterochromatin; Giant chromosomes-polytene and lampbrush chromosomes; Chromosomal aberrations – deletion, duplication, inversion and translocation.	**02.12.2019**
05.	1.Cell division: Mitosis: Cell cycle, mitotic stages, ultrastructure of centriole spindle fibre and its role in chromosome movements. Significance of mitosis, mitotic inhibitors; Meiosis: Stages of meiosis. Synaptonemal complex, chiasma formation, mechanism of crossing over.	**20.12.2019**
06.	1.Gene and Protein synthesis: Gene concept: cistron, recon and muton – definitions' Jumping genes or transposable genes – Barbara McClintock's work on maize, Characteristics of jumping genes, Split genes; Control of gene expression – Lac Operon; Genetic code: properties of genetic code, Transcription in prokaryotes – RNA polymerase, binding, initiation, elongation and termination; Post-transcriptional modification of mRNA – addition of cap, tail and RNA splicing – introns, exons and ribozymes; Translation in prokaryotes – aminoacylation of tRNA, elongation, termination	**04.01.2020**
07.	**Nature and Nurture:** Definition. Experiments on Potentillaglandulosa, Himalayan albino rabbit andHuman twins; Definition of norm of reaction, genetic homeostasis, phenocopy, penetrance and expressivity with examples – Huntington's chorea, PTC; Mendel's laws, Mono and dihybrid crosses. Incomplete dominance – flower colour inheritance in *Mirabilis jalapa,* Cytoplasmic (maternal) inheritance – shell coiling in Limnaea.	**23.01.2020**
08.	**Interaction of genes:** Supplementary factors–9:3:3:1(comb pattern in fowls) Dominant epistasis – 13:3 (plumagecolour in Leghorn and Wyandotte) Complimentary factors – 9:7 (flower colour in sweet peas) Multiple factors/ polygenic inheritance – (skin colour in man) Lethal genes – yellow coat colour in mice; Multiple Alleles: ABO blood groups in man; Isoalleles (Lozenze eye in *Drosophila*), pseudoalleles (Rh factor) and position effect (aristopedia in *Drosophila*.);Pleiotropism (Phenylketoneuria in Man and vestigial wing in *Drosophila*).	**06.02.2020**
09.	**Linkage and crossing over**: complete and incomplete linkage in*Drosophila*(grey body and vestigialwing). Significance of crossing over; **Genetic maps of chromosomes**: construction of chromosome maps, three-point test	**29.02.2020**

	cross in Drosophila(sc,ec,cv): **Sex linked inheritance:** Sex linked inheritance in *Drosophila* and man, Haemophiliaandcolour blindness in man. Sex linkage in poultry. Y-linked genes; **Sex determination**: Chromosomal basis of sex determination, Non-disjunction:primary and secondary, Genic balance theory. Gynandromorphs and intersexes in *Drosophila*, Klinefelter's and Turner's Syndromes. Environmental effect (Bonellia) and hormonal effects (Free Martin in cattles) on determination of sex.	
10.	**1.Gene mutation : Point mutation** –definition with example of sickle cell anemia, Types of mutations,direction magnitude of phenotypic effect. **Disorders due to mutant genes in man**: Sickle cell anemia, thalassemia. Inborn errors of metabolism; phenylketonuria, alkaptoneuria, albinism. Mutagens, CIB technique for detection of sex-linked mutations, Practical application and significance. **2.Human Genetics:** Eugenics, euthenics and euphenics; Human genomics – definition and brief account on its usefulness to mankind.	**18.03.2020**
11.	**Revision**	**31.03.2020**

IV SEMESTER ZOOLOGY

DSC 1D: PRACTICAL CELL BIOLOGY AND GENETICS

4 hr/week x16=64 hrs

Sl.No.	Particulars	Dates for 2019-20
01.	Micrometry: Use of ocular and stage micrometers to measure cell and nuclear dimensions.	**26.10.2019**
02.	Study of permanent slides of different stages of mitosis in onion root tip.	**02.11.2019**
03.	Squash preparation of onion root tip to study stages of mitosis.	**16.11.2019**
04.	Study of permanent slides of various stages of meiosis in grasshopper testis.	**30.11.219**
05.	Demonstration of squash preparation of grasshopper testis to study stages of meiosis.	**07.12.2019**
06.	Study of permanent slides of salivary gland chromosomes of *Drosophila.* Squash preparation of salivary gland chromosomes of *Drosophila* / Chironomous larva.	**21.12.2019**
07.	Study of permanent slide/ karyotype and idiogram of man	**31.12.2019**
08.	Preparation of karyotype from the given metaphase plate of *Drosophila* / Grasshopper.	**08.01.2020**
09.	Genetics problems a)Monohybrid inheritance – 1 animal (*Drosophila*) example. b)Dihybrid inheritance – 1 animal (*Drosophila*) example. c)Complementary genes – flower colour in Sweet pea d)Supplementary genes – comb pattern in Fowls. e)Epistatic (inhibitory) genes – plumage colour in Flowls. f) Multiple genes – Skin colour in Man.	**29.01.2020**
10.	a)Multiple alleles – ABO blood group in Humans (1 problem) b)Sex-linked inheritance in *Drosophila* (2) and in humans (2). c) Chromosomal abnormalities in Humans – Turner's, Klinefelter's and Down's syndromes (Chromosomal compliments and photos)	**13.02.2020**
11.	Construction of 3-point test cross linkage map (2 problems).	**28.02.2020**
12.	General morphology of *Drosophila* and mounting of sex comb and wing.	**04.03.2020**
13.	Identification of wild (male and female) and different types of mutants in *Drosophila* – white eye, bar eye, sepia eye, vestigial wing and yellow body.	**20.03.2020**
14.	Revision	**31.3.2020**

DSE 1B: ENVIRONMENTAL BIOLOGY (ELECTIVE 2)

4hr/weekX16=64 hr

Sl.No.	Particulars	Dates for 2019-20
01.	**Ecology** – Definition, sub-divisions and scope; **Environment** – Types: composition and strata of Atmosphere, hydrosphere and lithosphere; **Ecological factors**: Abiotic and biotic; **Abiotic factors** – light, temperature (thermal stratification), topographic(latitudes and altitudes); **Biotic factors** – Animal relationships with relevant examples: Intra specific- co-action, aggregation and competition, Gause's principle; Interspecific: positive interaction – mutualism, commensalism, protocooperation; negative interactions – parasitism, predation, and competition.	**09.11.2019**
02.	**1. Biogeochemical Cycles and Food chain** Definition, complete and incomplete cycles, Nitrogen and phosphorous cycles Food chains: types of food chains with examples and food web with examples. Ecological pyramids (number, biomass and energy) with examples. Energy – energy flow and laws of thermodynamics. **2. Population and Community Ecology:** Population ecology – Density – Natality and Mortality, age distribution. Community ecology – types of communities and community structure, bio-indicators of aquatic ecosystem, ecotone and edge effect. Ecological succession – basic types - primary and secondary, climax community.	**07.12.2019**
03.	**Ecosystem** Concept, types and structure of ecosystem, natural, human engineered and micro – ecosystems. **Fresh water ecosystem** –physico-chemical nature of fresh water. Lentic and lotic ecosystems withexamples. The tropical pond as an ecosystem – abiotic components, producers, consumers and decomposers, interaction between components. **Terrestrial ecosystem** –physico-chemical nature, soil profile, classification, biomes: forest, grassland**,** desert, and characteristic fauna.	**31.12.2019**
04.	**Environmental Pollution** Definition and types – air, water, soil and sound pollutions. Sources, effects and control of air, and water pollution with special mention of greenhouse effect, ozone depletion, photochemical smog, acid rain, stone leprosy. Ganga river pollution, mass death of fishes in lakes,; Legislation for environment protection in India, Pollution control board in Karnataka-functions	**31.01.2020**
05.	**Zoogeography and Wild life conservation** **Zoogeographical realms** and their characteristic fauna. Detailed account of fauna of oriental region, abrief account of Wallace's line. **Wildlife Depletion**: Hunting, over-harvesting, developmental activities **Wildlife Conservation**: conservation strategies (*in situ*and*ex situ*), agencies engaged in wildlifeconservation, Government organizations and non-government organizations (NGOs). Wildlife (Protection) Act 1972, CITES (Convention on International Trade in Endangered Species of wildlife flora and fauna), Endangered fauna of India, Red data book.	**29.02.2020**
06.	**Revision**	**31.03.2020**

V I SEM ZOOLOGY
DSE 1B: PRACTICAL ENVIRONMENTAL BIOLOGY (ELECTIVE 2)

4hr/week x16 = 64 hr

Sl.No.	Particulars	Dates for 2019-20
01.	Collection of water samples from different sources (pond, river, ground water, etc.) and recording color, odour,pH and temperature.	**26.10.2019**
02.	Estimation of dissolved oxygen in two water samples.	**09.11.2019**
03.	Estimation of BOD in two water samples (sewage and tapwater/river water)	**16.11.2019**
04.	Estimation of dissolved carbon dioxide in two water samples.	**23.11.2019**
05.	Estimation of chloride content in two water samples.	**30.11.2019**
06.	Estimation of hardness of two water samples.	**14.12.2019**
07.	Study of pond ecosystem – observation of various constituents, plankton, faunaand flora.	**21.12.2019**
08.	Study of artificial ecosystem-aquarium	**31.12.2019**
09.	Study of garden soil fauna using Berlesse funnel apparatus.	**11.01.2020**
10.	Positive animal interactions: Mutualism – Termite and Trichonympha,Commensalism– Echeineis and Shark, Proto co-operation – Hermit crab and Sea anemone.	**25.01.2020**
11.	Negative animal interactions: Parasitism – Head louse, Bedbug, Female mosquito, Ticks and mites. Predation – Snake and Frog.	**02.02.2020**
12.	Field visits to assess the pollution status of water bodies based onodour, water colour, release of sewage etc. Solid waste accumulation and disposal status /collection of data onair pollution from different agencies and preparation of report.	**7.03.2020**
13.	Revision	**31.03.2020**

॥ **JAI SRI GURUDEV** ॥

LESION PLAN FOR B.SC. (CBCS) ZOOLOGY COURSE FOR THE ACADEMIC YEAR 2020-21

Pedagogy: Lecture/Seminars/Group Discussion/Assignment

SUBJECT: ZOOLOGY
I SEMESTER: ZOOLOGY
DSC 1A: Animal Diversity-1 4 hr/ week X 16=64 hrs

Sl.No	Particulars	Dates for 2020-21
3.	Nonchordata-outlines of animalclassification. five kingdom concept, Binomial nomenclature, Definition of species Nonchordata-outlines of animalclassification.	14.06.2020
2.	Protozoa: General characters and classification up to classes with examples; Locomotion (amoeboid, flagellar and ciliary- excluding theories) and reproduction (fission and conjugation); Plasmodium: Morphology, life cycle, pathogenicity and preventive measures of *Plasmodium vivax*	27.06.2020
3.	Concept of Metazoa; Levels of organization - Cell, tissue, organ, organ system (Definition with examples); Porifera: General characters with classification up to classes with examples; Sponge spicules, canal system (Ascon, Sycon, leucon, rhagon) and larvae amphiblastula and parenchymula)	9.07.2020
4.	Cnidaria: General characters and classification up to classes with examples; Polymorphism in cnidaria- Obelia and Halistemma, Structure of corallite, types of coral reefs, importance of corals. Acnidaria: Salient features and systematic position of Ctenophora.	24.07.2020
5.	Concept of coelom: Acoelom, Pseudocoelom, Eucoelom (Definition with examples). Helminthes Platyhelminthes: General characters and classification up to classes with examples; *Taenia solium* - Life cycle, pathogenicity and preventive measures. Aschelminthes: General characters and examples; morphology, transmission, pathogenicity and preventive measures of *Ascaris ,Ancyclostoma* and *Wucheraria*. Parasitic adaptations in helminthes.	10.08.2020
6.	Annelida: General characters and classification up to classes with examples. Type study: i) Pheretima- Morphology, setae, digestive, circulatory, excretory (nephridium), nervous and reproductive systems, Trochophore larva and its significance; ii). Leech- Morphology and parasitic adaptations; iii) Tubiculous worms- tubiculous adaptations in *Nereis* and *chaetopterus*.	24.08.2019
7.	Onychophora: Salient features of *Peripatus* and systematic position of Onychophora. Arthropoda : General characters and classification up to classes with examples, Type study- Cockroach- Morphology, digestive, respiratory and nervous systems; direct and indirect	07.09.2020

	development in insects- description with examples; harmful and beneficiary insects- brief general account with examples; social organization in insects (Terminte).	
8.	Mollusca: General characters and classification with examples; Type study- Fresh water Mussel- morphology, digestive, respiratory and nervous systems; foot in mollusca, Diversity in Molluscan shells .	17.09.2020
9.	Echinodermata: General characters and classification with examples; Type study- Star fish- morphology and water-vascular system; echinoderm larvae and their phylogenetic significance.	26.09.2020
10.	Regenerative ability in invertebrates; Symmetry in invertebrates (Cell aggregates, blind sac,tube within tube).	03.10.2020
11.	Revision	14.10. 2020

I SEMESTER: ZOOLOGY

DSC 1A: I SEMESTER: ZOOLOGY 4 hrs/week x16= 64 hrs

Sl.No	Particulars	Datesfor 2020-21
01.	A) Study of Microsope. B) Study of permanent slides of protozoa: Amoeba, Entamoeba, Polystomella. Euglena, Paramecium, Balantidum,Vorticella.	**22.06.2020**
02.	Preparation of protozoan culture by students and observation of protozoan culture	**29.06.2020**
03.	Porifera: Study of slides/specimens –Sycon, Spongilla, Euspongia,Sponge gemmule, Monaxon spicules.	**06.07.2020**
04.	Cnidaria: Hydra, Physalia, Aurelia, Ephyra larva, Metridium, Gorgonia, Madrepora Pennatula, Corallium rubrum, Fungia,Favia,Meandrina.	**13.07.2020**
05.	Helminthes: Planaria, Fasciola, Taenia, Ascaris-male and female Scolex of Taenia,T.S. of Taenia and Ascaris (male or female)	**20.07.2020**
06.	Annelida: Pheritima, Nereis, Chaetopterus, Aphrodite. Leech, T.S of Nereis and Leech	**27.07.2020**
08.	Temporary slide preparation of whole mounts of coelenterate colonies: Obelia, Sertularia,Bougainvillea, companularia , pennaria (any four)/Observation of permanent slides.	**03.08.2020**
09.	Onychophora: Peripatus,Arthropoda : Panaeus, Nauplius larva, Mysis larva. Scolopendra, Spirostreptus, Palamnaeus, Aranea,	**10.08.2020**
10.	Field study: Observation of Arthropods in and around the college campus, identifying and recording in the practical record (Minimum five insects).	**17.08.2020**
11.	Taxonomic study of insects up to orders giving key for identification, selecting any five locally available common examples and recording them.	**24.08.2020**
12.	Study of Arthropodan pests: Periplaneta, Rhinicerous beetle, Termite and Weevil. Study of Arthropodan vectors: Culex, Aedes, Anopheles mosquitoes and house fly.	**31.08.2020**
13.	Study of mouth parts of insects: Cockroach, female mosquito, house fly, and honey bee (permanent slides).	**07.09.2020**
14.	Cockroach: Study of digestive system and nervous system.	**14.09.2020**
15.	Mollusca: Chiton, Dentallium shell, Xancus shell, Aplysia, Unio, Octopus.	**21.09.2020**
16.	Echinodermata: - Astropecten, Ophiothrix, Salmacis, Holothuria. Echinodermata: Antedon, Bipinnaria larva, Pluteus larva, Pedicellaria of sea urchin.	**28.09.2020**
17.	Reversion	**14.10.2020**

III SEMESTER: ZOOLOGY

DSC 1C : ANIMAL PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY 4hr /week X 16=64 hr

Sl.No	Particulars	Datesfor 2019-20
01.	**Homeostasis:** Definition and significance, water, glucose and salt balance. Osmoregulation: Osmoconformers and osmoregulators, osmoregulation in shark, marine and freshwater teleosts, terrestrial mammals (Kangaroo rat and Camel). **Thermoregulation:** Effects of temperature change- Q 10 effect, Causes of thermal deaths;Definition of ectotherm, endotherms, poikilotherms, and homeotherms, Heterotherms; Temperature compensation in poikilotherms and homeotherms; A note on aestivation and hibernation.	**21.06.2020**
02.	**Digestion:** Hunger and apetite; digestion and absorption of carbohydrates, proteins and lipids. **Respiration:** Physiology of respiration – exchange of gases; Transport of oxygen, oxygen dissociation curve-Bohr's effect, Transport of carbon dioxide – chloride shift, respiratory quotient; Cellular respiration: Glycolysis, Kreb's cycle, oxidative phosphorylation, energy budget.	**05.07.2020**
03.	**Circulation:** Structure and functions of human heart, regulation of heart beat, blood pressure, Mechanism of blood clotting. **Nitrogen Excretion:** Types of nitrogen excretion- Definition and examples of ammonotelism, ureotelism, uricotelism and gaunotelism; Ornithine cycle, nitrogen excretion in relation to water economy, physiology of urine formation in man.	**18.07.2020**
04.	**Neurophysiology**: Structure of multipolar neuron,Types of neurons and neuro-synapses, Membrane potentials (resting and action), Axonic and synaptic transmission of nerve impulses. **Muscle Physiology**: Types of muscles- Morphological (Striated and non-striated) and functional (voluntary and involuntary); Structure and mechanism of contraction of skeletal muscle (Initiation, contractile and regulatory proteins, sliding filament theory, energy for contraction), neuro-muscular junction.	**31.07.2020**
05.	**Gametogenesis:** Spermatogenesis – formation of spermatids, spermiogenesis. Oogenesis, type of eggs – based on quantity and distribution of yolk with examples. Egg membranes. **Fertilization:** Details of the process with reference to sea urchin – approach of gametes, role of fertilizin and antifertilizin, gamones and their role, activation, penetration, reaction of the egg and amphimixis, monospermy and polyspermy (physiological and pathological), significance of fertilization.	**29.07.2020**
06.	**Parthenogenesis:** Cytology of natural parthenogenesis – arrhenotoky, thelytoky (amictic and apomictic) and cyclical parthenogenesis with examples,; Artificial parthenogenesis – Loeb's and Bataillon's experiments, Significance of parthenogenesis, a brief notecloning.	**12.08.2020**

07.	**Cleavage:** Types of cleavage – holoblastic, meroblastic, radial, spiral and superficial types with examples; Planes of cleavage – meridonal, vertical, equatorial and latitudinal. **Development of frog:** Cleavage, blastula, gastrulation, neurulation, fatemaps; Organizer phenomenon – definition, Experiment of Spemann and Mangold, Potencies of the dorsal lip of the blastopore of amphibian gastrula; Definitions of competence, determination and differentiation	**26.08.2020**
08.	**Development of chick:** Structure of hen's egg, cleavae, blastula, gastrulation – origin and development of primitive streak; **Foetal Membranes:** Development, structure and functions of amnion, chorion, yolk sac and allantois. **Placenta:** Histological and morphological classification with examples. Placental hormones.	**15.09.2020**
09.	**Human Development:** Structure of mature spermatozoan, Graafian follicle, ovulation, fertilization, morula, blastocyst, implantation, gastrulation; Organogenesis – outlines of derivatives of different germ layers.	**27.09.2020**
10.	**Revision**	**14.10.2020**

III SEMESTER: ZOOLOGY

DSC 1C : PRACTICAL ANIMAL PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY

4hr /week X 16=64 hr

Sl.No.	Particulars	Datesfor 2020-21
01.	Salivary amylase activity assay.	**22.06.2020**
02.	Dehydrogenase activity assay in milk.	**29.06.2020**
03.	Estimation of proteins by colorimetric method- Biuret method.	**06.07.2020**
04.	Detection of nitrogenous excretory wastes in the given samples: Ammonia- Nessler's reagent test, Urea- Urease test and Uric acid- Folin's test.	**13.07.2020**
05.	Detection of abnormal excretion of glucose, albumin and creatinine in human urine. Glucose- Benedict's test, albumin- Heller's ring test, Creatinine- Jaffe's test.	**20.07.2020**
06.	Blood typing- A, B, AB, O and Rh factors in given human blood samples using antisera. Preparation of haematin crystals.	**27.07.2020**
07.	Analysis of amino acids by Paper chromatography- demonstration.	**03.08.2020**
08.	Total RBC count, differential count of WBC, Hb count, clotting time- Demonstration.	**10.08.2020**
09.	Electrophoresis- demonstration.	**17.08.2020**
10.	Identification of the sources of different fat soluble and water-soluble vitamins, their role and deficiency diseases (Sources have to be specified, avoiding overlapping ones).	**24.08.2020**
11.	Study of different types of eggs – Graafian follicle, frog's egg, hen's egg and insect egg. Study of grasshopper, frog and mammalian sperms.	**31.08.2020**
12.	Frog: cleavage stages, blastula (section), gastrula (yolk plug stage) and neurula (sections)	**07.09.2020**
13.	Chick embryo: 18 hrs. 24 hrs. 36 hrs. and 48 hrs (WM and sections).	**14.09.2020**
14.	Study of development - Hen's egg – window technique.	**21.09.2020**
15 & 16	Study of Developmental stages in *Drosophila* – egg, larva and pupa.	**28.09.2020**
17.	Revision	**14.10.2020**

V SEM ZOOLOGY

DSE 1A: BIOCHEMISTRY AND APPLIED ZOOLOGY (ELECTIVE 1)

4hr/weekX16=64 hr

Sl.No.	Particulars	Datesfor 2020-21
01.	**Carbohydrates**: Definition and classification: biological importance of monosaccharaides (glucose, fructose, ribose, deoxyribose), disachharides (sucrose, lactose, maltose), and polysachharides (homopolysachharides- starch, glycogen, dextrin and heteropolysachharides-heparin, chondrotin sulphate, hyaluronic acid, glucoronic acid).	**29.06.2020**
02.	**Proteins**: Elementary classification of amino acids: Simple and conjugated proteins with examples; Primary, secondary, tertiary and quaternary structure of proteins with haemoglobin as example, Biological importance of proteins.	**20.07.2020**
03.	**Lipids:** Defination and classification; biological importance of phospholipids, neutral lipids and Glycolipids; Clinical importance of lipids- lipid profile of blood.	**10.08. 2020**
04.	**Nucleic Acids**: Classification and structure of DNA and RNA. Watson and Crick model of DNA, cloverleaf model of t-RNA. **Enzymes:** Classification, properties, mechanism of enzyme action- induced fit theory; factors affecting enzyme action**,** Co enzymes and inhibitors**,** biological importance of enzymes. **Vitamins:** Classification; Source, importance, daily recommended dosage and deficiency diseases of fat soluble and water soluble vitamins.	**22.08.2020**
05.	Purposes and definitions of poultry, dairy, piggery, fishery, vermiculture, apiculture, pearl culture and aquaculture Sericulture: Morphology and life cycle of *Bombyx mori*, rearing up to cocoon stage, non- mulberry silkworms. Vermicultur**e:** Types of vermiculture**,** Different species of earthworms used for vermiculture. Composition of vermicompost and its importance. Culture practice of Indian major carps, Pearl formation.	**07.09.2019**
06.	**Pests, Parasites and Vectors** 1. Insects as pests – on food (cereals, pulses, coffee,) and vegetable (Cauli flower) crops . (One example for each with description of part of the plant affected and economic loss) 2.Parasitic protozoa (entamoeba), nematodesAnclyostoma), helminthes(tape worm) and their human diseases (symptoms of diseases, mode of transmission, control measures) 3.Vectors: Mosquitoes, ticks, mites, cockroaches, rat and their human diseases. (vector species, mode of transmission, control measures)	**17.09.2020**
07.	**Wild life** **a.** Uniqueness of Indian wildlife**,** Important fauna of Indian forests**;** **b.** Endangered, threatened, vulnerable, rare and extinct species (definitions with	**28.10.2020**

	examples), Red data book, green data book. **c.** Biodiversity hotspots- meaning, Salient features of biodiversity hotspots of India (number of plant and animal species, endemic species to be highlighted)	
08.	**Biostatics** Introduction – tabulation of data. Bar diagram, Histogram. Frequency distribution – mean, median and mode. Standard deviation and standard error. Chi-square test with problems.	**05.10. 2020**
09.	**Revision**	**14.10.2020**

V SEM ZOOLOGY)

DSE 1A: PRACTICAL BIOCHEMISTRY AND APPLIED ZOOLOGY (ELECTIVE 1)

4hr/weekx16=64 hr

Sl.No.	Particulars	Datesfor 2020-21
01.	Qualitative tests to detect carbohydrates in the given test samples- Molisch's test, Iodine test, Fehling's test and Picric acid test.	**22.06.2020**
02.	Qualitative tests to detect proteins in the given test samples- Biuret test, Ninhydrin test, Millon's test and Xanthoproteic test.	**28.06.2020**
03.	Qualitative tests to detect lipids in the given test samples- Acrolin test, Sudan 3 test, Salkowasky test.	**06.07.2020**
04.	Detection of normal and abnormal constituents of urine.	**13.07.2020**
05.	Demonstration of Vermiculture in the laboratory or college campus.	**23.07.2020**
06.	Morphology and life history of *Bombyx mori*.	**30.07.2020**
07.	Identification and uses of different equipment in silkworm rearing.	**07.08.2020**
08.	Morphology of different species of locally available honey bee species and enlisting their foraging plants	**16.08.2020**
09.	Identification of different local food fishes (any five).	**24.08.2020**
10.	Collection of data such as height, weight, blood groups, etc. among students and calculation – mean, standard deviation and errors,. Construction of graph, histograms and bar diagrams using data obtained. (A minimum of two sets of data for each of statistical calculation)	**10.09.2020**
11.	Field oriented projects – to be changed every year: i) Visit to Vermiculture farm/silkworm rearing center /Fish farm/ Dairy/ Poultry/ Zoo/ wildlife sanctuary for on the spot study of culture practice and a report to be submitted .	**24.09.2020**
12.	ii) Enlisting different invertebrate/vertebrate fauna in the college campus/ town/ nearby hill/farms. Study may focus on particular group eg. birds, reptiles, insects, etc. A detailed report on their taxonomic position, habitat preference etc. has to be prepared. Two reports, one from each section has to be submitted for assessment.	**03.10.2020**
13.	**Revision**	**14.10.2020**

II SEMESTER: ZOOLOGY

DSC 1B: ANIMAL DIVERSITY 2 4hr/week=64hr

Sl.No	Particulars	Datesfor 2020-21
01.	Chordata- General characters and classification up to classes with examples;,concept of protochordata. Hemichordata- General characters, Balanoglossus- externals, proboscis complex, Tornaria larva; Affinities of Hemichordata with Annelida, Echinodermata and Chordata.	**31.10.2020**
02.	Cephalochordata- Amphioxus- externals, feeding mechanism, digestive and circulatory system; Urochordata- Ascidia- externals and brief description of internal morphology, larva and metamorphosis. Cyclostomata: Salient features of Petromyzon, Ammocoetes larva and its significance	**16.11.2020**
03.	Vertebrata**:** General characters and classification with examples Pisces **–** General characteristics of fishes; Differences between Chondrichthyes and Osteichthyes; Type study: *Scoliodon*- Morophology, respiratory and lateral line systems; Scales in fishes, Salient features and discontinuous distribution of Dipnoi.	**30.11.2020**
04.	Amphibia**:** General characters and classification up to orders, distinguishing features of living amphibians with suitable examples; Type study-Frog: Externals, digestive, respiratory, circulatory and urinogenital systems. Reptilia: General characters and classification up to orders with suitable examples; Temporal fossae and arcades in reptiles and their significance; Indian snakes - poisonous and nonpoisonous, poison apparatus, key for identification of nonpoisonous and poisonous snakes.	**18.12.2020**
05.	**Aves:** General characters and classification up to sub classes, *Archaeopteryx*- evolutionary significance, Distinctive features of Archaeornithes and Neornithes - Palaeognathae, Impennae and Neognathae with suitable examples; Flight Adaptations in birds - morphological, anatomical and physiological; Bird migration- preparation, causes, pattern, navigation, mechanics, orientation and advantages	**31.12.2020**
06.	**Mammalia:** General characters and classification up to subclasses; Distinctive features of prototheria, metatheria and eutheria with important examples; Affinities of prototheria;. **Type study**- Rabbit**:** Externals, digestive, respiratory,	**16.01.2021**

	circulatory and urinogenital systems.	
07.	Important characters and distribution with examples – Primates, Chiroptera, Cetacea, Perissodactyla, Artiodactyla, Carnivora, Rodentia and Proboscidia; Dentition in mammals – tooth structure, types, specialization and dental formula in Carnivora (cat, dog), Rodentia (rat), Proboscidia (elephant), Artiodactyla (Horse), Perissodactyla (cow) and Primates (man and monkey).	**10.02.2021**
08.	**Comparative anatomy**: Comparative anatomy of heart- Pisces (Shark), Amphibia (frog), Reptilia (Garden lizard) Aves (pigeon), Mammalia (man); Evolution of brain in vertebrates-brain of shark, frog, varanus, pigeon and man; Evolution of kidney in vertebrates - pronephros (Pisces –shark), mesonephros (Amphibia- frog), Metanephros (Reptilia - garden lizard), Aves(pigeon) and Mammalia (man); Aortic arches in vertebrates.	**15.03.2021**
09	**Revision**	**31.03.2021**

II SEMESTER :ZOOLOGY
DSC 1B: PRACTICAL ANIMAL DIVERSITY 2 4hr/weekx16=64hr

Sl.No.	Particulars	Dates for 2020-21
01.	**Hemichordata:** Balanoglossus, T.S. through proboscis, collar, branchio-genital region. **Urochordata:** Ascidia **Cephalochordata:** Amphioxus, T.S. through pharynx and intestine.	**26.10.2020**
02.	Cyclostomata: Petromyzon, Ammocoetes larva, Myxine.	**02.11.2020**
03.	Fishes: Scoliodon, Zygaena, Pristis, Narcin, Trygon.: Echeinis, Hippocampus, Anguilla.	**09.11.2020**
04.	Slide preparation :placoid, cycloid and ctenoid scales.	**23.11.2020**
05.	Amphibia: Ichthyophis. Salamander, Axolotl larva, Rana,	**30.11.2020**
06.	Reptilia: Varanus, Chelone, cobra, Viper, Krait,, sea snake, Rat snake.	**10.12.2020**
07.	Aves: Kingfisher, Parakeet, Woodpecker, Crow, Owl, Duck. Structure of a quill feather.	**18.12.2020**
08.	Mammalia: Rabbit, Rat, Bat, Loris.	**25.12.2020**
09.	Osteology: Skulls of shark, Frog and Crocodile.	**04.01.2021**
10.	Osteology: Skulls of Pigeon and Rabbit.	**14.01.2021**
11.	Osteology: Vertebrae (atlas, pro, amphi, and acoelous) of frog, Pigeon (heterocoelous andsynsacrum) and Rabbit (atlas, axis and thoracic)	**26.01.2021**
12.	Osteology: Pectoral girdles and forelimb skeletons of Frog, Pigeon and Rabbit. Pelvic girdles and hindlimbs of Frog, Pigeon and Rabbit.	**04.02.2021**
13.	Bird watching: Preparation and submission of checklist of birds in the campus/ nearby places.	**20.02.2021**
14.	Study of internal systems (digestive, circulatory, nervous and excretory) of Frog/ rat.	**12.03.2021**
15.	Revision	**31.03.2021**

IV SEMESTER : ZOOLOGY
DSC 1D: CELL BIOLOGY AND GENETICS 4hr/week x16=64hr

Sl.No.	Particulars	Dates for 2020-21
01.	The Cell: Ultrastructure of an animal cell.	**22.10.2020**
02.	Membrane system: Plasma membrane: Ultrastructure – fluid mosaic model, functions. Endoplasmic reticulum: Ultrastructure, types, origin and functions. Golgi complex: Occurrence, morphology, origin and functions. Lysosome: Occurrence, structure, enzymes, polymorphism, functions.	**31.10.2020**
03.	1. Mitochondria: Morphology, distribution, ultrastructure and functions; Mitochondria as semi-autonomous organelles. 2. Ribosomes: Occurrence, distribution, types, chemical composition, dissociation and reconstitution	**16.11.2020**
04.	1. Nucleus: Ultrastructure of nucleus, nuclear membrane, nucleoplasm and chromatin fibres; Ultrastructure and functions of nucleolus. 2. Chromosome: Morphology and ultrastructure (nucleosome model) and chemical composition, number, size; Karyotype and idiogram; euchromatin and heterochromatin;types of heterochromatin; Giant chromosomes-polytene and lampbrush chromosomes; Chromosomal aberrations – deletion, duplication, inversion and translocation.	**02.12.2020**
05.	1.Cell division: Mitosis: Cell cycle, mitotic stages, ultrastructure of centriole spindle fibre and its role in chromosome movements. Significance of mitosis, mitotic inhibitors; Meiosis: Stages of meiosis. Synaptonemal complex, chiasma formation, mechanism of crossing over.	**20.12.2020**
06.	1.Gene and Protein synthesis: Gene concept: cistron, recon and muton – definitions' Jumping genes or transposable genes – Barbara McClintock's work on maize, Characteristics of jumping genes, Split genes; Control of gene expression – Lac Operon; Genetic code: properties of genetic code, Transcription in prokaryotes – RNA polymerase, binding, initiation, elongation and termination; Post-transcriptional modification of mRNA – addition of cap, tail and RNA splicing – introns, exons and ribozymes; Translation in prokaryotes – aminoacylation of tRNA, elongation, termination	**04.01.2021**
07.	**Nature and Nurture:** Definition. Experiments on Potentillaglandulosa, Himalayan albino rabbit andHuman twins; Definition of norm of reaction, genetic homeostasis, phenocopy, penetrance and expressivity with examples – Huntington's chorea, PTC; Mendel's laws, Mono and dihybrid crosses. Incomplete dominance – flower colour inheritance in *Mirabilis jalapa*, Cytoplasmic (maternal) inheritance – shell coiling in Limnaea.	**23.01.2021**
08.	**Interaction of genes:** Supplementary factors–9:3:3:1(comb pattern in fowls) Dominant epistasis – 13:3 (plumagecolour in Leghorn and Wyandotte) Complimentary factors – 9:7 (flower colour in sweet peas) Multiple factors/ polygenic inheritance – (skin colour in man) Lethal genes – yellow coat colour in mice; Multiple Alleles: ABO blood groups in man; Isoalleles (Lozenze eye in *Drosophila*), pseudoalleles (Rh factor) and position effect (aristopedia in *Drosophila*.);Pleiotropism (Phenylketoneuria in Man and vestigial wing in *Drosophila*).	**06.02.2021**

09.	**Linkage and crossing over**: complete and incomplete linkage in*Drosophila*(grey body and vestigialwing). Significance of crossing over; **Genetic maps of chromosomes**: construction of chromosome maps, three-point test cross in Drosophila(sc,ec,cv): **Sex linked inheritance:** Sex linked inheritance in *Drosophila* and man, Haemophiliaandcolour blindness in man. Sex linkage in poultry. Y-linked genes; **Sex determination**: Chromosomal basis of sex determination, Non-disjunction:primary and secondary, Genic balance theory. Gynandromorphs and intersexes in *Drosophila*, Klinefelter's and Turner's Syndromes. Environmental effect (Bonellia) and hormonal effects (Free Martin in cattles) on determination of sex.	**29.02.2021**
10.	**1.Gene mutation : Point mutation** –definition with example of sickle cell anemia, Types of mutations,direction magnitude of phenotypic effect. **Disorders due to mutant genes in man**: Sickle cell anemia, thalassemia. Inborn errors of metabolism; phenylketonuria, alkaptoneuria, albinism. Mutagens, CIB technique for detection of sex-linked mutations, Practical application and significance. **2.Human Genetics:** Eugenics, euthenics and euphenics; Human genomics – definition and brief account on its usefulness to mankind.	**18.03.2021**
11.	**Revision**	**31.03.2021**

IV SEMESTER ZOOLOGY
DSC 1D: PRACTICAL CELL BIOLOGY AND GENETICS
4 hr/week x16=64 hrs

Sl.No.	Particulars	Dates for 2020-21
01.	Micrometry: Use of ocular and stage micrometers to measure cell and nuclear dimensions.	**26.10.2020**
02.	Study of permanent slides of different stages of mitosis in onion root tip.	**3.11.2020**
03.	Squash preparation of onion root tip to study stages of mitosis.	**10.11.2020**
04.	Study of permanent slides of various stages of meiosis in grasshopper testis.	**18.11.2020**
05.	Demonstration of squash preparation of grasshopper testis to study stages of meiosis.	**02.12.2020**
06.	Study of permanent slides of salivary gland chromosomes of *Drosophila.* Squash preparation of salivary gland chromosomes of *Drosophila* / Chironomous larva.	**17.12.2020**
07.	Study of permanent slide/ karyotype and idiogram of man	**25.12.2020**
08.	Preparation of karyotype from the given metaphase plate of *Drosophila* / Grasshopper.	**01.01.2020**
09.	Genetics problems a)Monohybrid inheritance – 1 animal (*Drosophila*) example. b)Dihybrid inheritance – 1 animal (*Drosophila*) example. c)Complementary genes – flower colour in Sweet pea d)Supplementary genes – comb pattern in Fowls. e)Epistatic (inhibitory) genes – plumage colour in Flowls. f) Multiple genes – Skin colour in Man.	**15.01.2021**
10.	a)Multiple alleles – ABO blood group in Humans (1 problem) b)Sex-linked inheritance in *Drosophila* (2) and in humans (2). c) Chromosomal abnormalities in Humans – Turner's, Klinefelter's and Down's syndromes (Chromosomal compliments and photos)	**31.01.2021**
11.	Construction of 3-point test cross linkage map (2 problems).	**18.02.2021**
12.	General morphology of *Drosophila* and mounting of sex comb and wing.	**05.03.2021**
13.	Identification of wild (male and female) and different types of mutants in *Drosophila* – white eye, bar eye, sepia eye, vestigial wing and yellow body.	**15.03.2021**

DSE 1B: ENVIRONMENTAL BIOLOGY (ELECTIVE 2)

4hr/weekX16=64 hr

Sl.No.	Particulars	Dates for 2020-21
01.	**Ecology** – Definition, sub-divisions and scope; **Environment** – Types: composition and strata of Atmosphere, hydrosphere and lithosphere; **Ecological factors**: Abiotic and biotic; **Abiotic factors** – light, temperature (thermal stratification), topographic(latitudes and altitudes); **Biotic factors** – Animal relationships with relevant examples: Intra specific- co-action, aggregation and competition, Gause's principle; Interspecific: positive interaction – mutualism, commensalism, protocooperation; negative interactions – parasitism, predation, and competition.	**22.10.2020**
02.	**1. Biogeochemical Cycles and Food chain** Definition, complete and incomplete cycles, Nitrogen and phosphorous cycles Food chains: types of food chains with examples and food web with examples. Ecological pyramids (number, biomass and energy) with examples. Energy – energy flow and laws of thermodynamics. **2. Population and Community Ecology:** Population ecology – Density – Natality and Mortality, age distribution. Community ecology – types of communities and community structure, bio-indicators of aquatic ecosystem, ecotone and edge effect. Ecological succession – basic types - primary and secondary, climax community.	**16.11.2020**
03.	**Ecosystem** Concept, types and structure of ecosystem, natural, human engineered and micro – ecosystems. **Fresh water ecosystem** –physico-chemical nature of fresh water. Lentic and lotic ecosystems withexamples. The tropical pond as an ecosystem – abiotic components, producers, consumers and decomposers, interaction between components. **Terrestrial ecosystem** –physico-chemical nature, soil profile, classification, biomes: forest, grassland**,** desert, and characteristic fauna.	**20.12.2020**
04.	**Environmental Pollution** Definition and types – air, water, soil and sound pollutions. Sources, effects and control of air, and water pollution with special mention of greenhouse effect, ozone depletion, photochemical smog, acid rain, stone leprosy. Ganga river pollution, mass death of fishes in lakes,; Legislation for environment protection in India, Pollution control board in Karnataka-functions	**20.12.2020**
05.	**Zoogeography and Wild life conservation** **Zoogeographical realms** and their characteristic fauna. Detailed account of fauna of oriental region, abrief account of Wallace's line. **Wildlife Depletion**: Hunting, over-harvesting, developmental activities **Wildlife Conservation**: conservation strategies (*in situ*and*ex situ*), agencies engaged in wildlifeconservation, Government organizations and non-government organizations (NGOs). Wildlife (Protection) Act 1972, CITES (Convention on International Trade in Endangered Species of wildlife flora and fauna), Endangered fauna of India, Red data book.	**10.02.2021**
06.	**Revision**	**31.03.2021**

V I SEM ZOOLOGY
DSE 1B: PRACTICAL ENVIRONMENTAL BIOLOGY (ELECTIVE 2)

4hr/week x16 = 64 hr

Sl.No.	Particulars	Dates for 2020-21
01.	Collection of water samples from different sources (pond, river, ground water, etc.) and recording color, odour,pH and temperature.	**26.10.2020**
02.	Estimation of dissolved oxygen in two water samples.	**3.11.2020**
03.	Estimation of BOD in two water samples (sewage and tapwater/river water)	**10.11.2020**
04.	Estimation of dissolved carbon dioxide in two water samples.	**18.11.2020**
05.	Estimation of chloride content in two water samples.	**02.12.2020**
06.	Estimation of hardness of two water samples.	**17.12.2020**
07.	Study of pond ecosystem – observation of various constituents, plankton, faunaand flora.	**25.12.2020**
08.	Study of artificial ecosystem-aquarium	**01.01.2020**
09.	Study of garden soil fauna using Berlesse funnel apparatus.	**15.01.2021**
10.	Positive animal interactions: Mutualism – Termite and Trichonympha,Commensalism– Echeineis and Shark, Proto co-operation – Hermit crab and Sea anemone.	**31.01.2021**
11.	Negative animal interactions: Parasitism – Head louse, Bedbug, Female mosquito, Ticks and mites. Predation – Snake and Frog.	**18.02.2021**
12.	Field visits to assess the pollution status of water bodies based onodour, water colour, release of sewage etc. Solid waste accumulation and disposal status /collection of data onair pollution from different agencies and preparation of report.	**05.03.2021**
13.	Revision	**15.03.2021**

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, C R PATANA-573116.

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LESSION PLAN FOR THE ACADEMIC YEAR 2021-22

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Paper name: Cytology, Genetics and infectious diseases

Programme : B.Sc. Hons
Class : I SEM (DSC) **Total Hours: 56 hours**
Name of the faculty : MN, KMR and UA
Duration : October to February

Sl.No.	Topics Covered	No. of Lecture Hours	Methodology/pedagogy
01.	**Chapter 1.** **Structure and Function of Cell Organelles** I in Animal cell. **Plasma membrane:** chemical structure-lipids and proteins. **Endomembrane system**: protein targeting and sorting, transport, endocytosis and exocytosis. **Chapter 2.** Structure and Function of Cell Organelles II in Animal Cell. **Cytoskeleton:** microtubules, microfilaments, intermediate filaments. **Mitochondria**: Structure, oxidative phosphorylation; electron transport system. **Peroxisome and Ribosome:** structure and function.	14	Lectures/Videos / Seminars/Project/ Group discussion/ Assignment
02.	**Capter 3.** **Nucleus and Chromatin Structure -** Structure and function of nucleus in eukaryotes, Chemical structure and base composition of DNA and RNA, DNA supercoiling, chromatin organization, structure of chromosomes, Types of DNA and RNA. **Chapter 4.** **Cell cycle, Cell Division and Cell Signaling -Cell division:** mitosis and meiosis, Introduction to Cell cycle and its regulation, apoptosis , **Signal transduction**: intracellular 11 signaling and cell surface receptors, via G-protein linked receptors, **Cell-cell interaction**: cell adhesion molecules, cellular junctions	14	Lectures/Videos / Seminars/Project/ Group discussion/ Assignment
03.	**Chapter 5**. **Mendelism and Sex Determination** **Basic principles of heredity:** Mendel‘s laws- monohybrid cross and hybrid cross, Complete and Incomplete Dominance, Penetrance and expressivity, Genetic Sex-	14	Lectures/Videos / Seminars/Project/ Group discussion/ Assignment

	Determining Systems, Environmental Sex Determination, Sex Determination and mechanism in Drosophilamelanogaster. Sex-linked characteristics in humans and dosage compensation. **Chapter 6**. **Extensions of Mendelism, Genes and Environment Extensions of Mendelism:** Multiple Alleles, Gene Interaction. **The Interaction Between Sex and Heredity**: Sex-Influenced and Sex-Limited. Characteristics Cytoplasmic Inheritance, Genetic Maternal Effects. **Interaction between Genes and Environment:** Environmental Effects on Gene Expression, Inheritance of Continuous Characteristics.		
04.	**Chapter 7.** **Human Chromosomes and Patterns of Inheritance Patterns of inheritance**: autosomal dominance, autosomal recessive, X-linked recessive, X-linked dominant. **Chromosomal anomalies:** Structural and numerical aberrations with examples. Human karyotyping and Pedigree analysis. **Chapter 8.** **Infectious Diseases Introduction to pathogenic organisms:** viruses, bacteria, fungi, protozoa and worms. Structure, life cycle, pathogenicity, including diseases, causes, **symptoms and control of common parasites:** Trypanosoma,Giardia and Wuchereria.	14	Lectures/Videos / Seminars/Project/ Group discussion/ Assignment
List of labs to be conducted		**56 Hrs.**	
1. Understanding of simple and compound microscopes. 2. To study different cell types such as buccal epithelial cells, neurons, striated muscle cells using 3. Methylene blue/any suitable stain (virtual/ slaughtered tissue). 3. To study the different stages of Mitosis in root tip of Allium cepa. 4. To study the different stages of Meiosis in grasshopper testis (virtual). 5. To check the permeability of cells using salt solution of different concentrations. 6. Study of parasites in humans (e.g. Protozoans, Helminthes in compliance with examples beingstudied in theory) permanent microslides. 7. To learn the procedures of preparation of temporary and permanent stained slides, with available mounting material. 8. Study of mutant phenotypes of Drosophila sp. (from Cultures or Photographs). 9. Preparation of polytene chromosomes (Chironomus larva or Drosophila larva). 10. Preparation of human karyotype and study the chromosomal structural and numerical aberrations from the pictures provided. (Virtual/optional). 11. To prepare family pedigrees			

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LESSION PLAN FOR THE ACADEMIC YEAR 2021-22

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Paper name: ANIMAL PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY

Programme : B.Sc. (CBCS)
Class : III SEM **Total Hours: 64 hours**
Name of the faculty : MN, KMR and UA
Duration : October to February

Sl.No	**Particulars**	**No. of Lecture Hours**	**Methodology/pedagogy**
01.	**Homeostasis:** Definition and significance, water, glucose and salt balance. Osmoregulation: Osmoconformers and osmoregulators, osmoregulation in shark, marine and freshwater teleosts, terrestrial mammals (Kangaroo rat and Camel). **Thermoregulation:** Effects of temperature change- Q 10 effect, Causes of thermal deaths;Definition of ectotherm, endotherms, poikilotherms, and homeotherms, Heterotherms; Temperature compensation in poikilotherms and homeotherms; A note on aestivation and hibernation.	07	Lectures/Videos / Seminars/ Group discussion/ Assignment
02.	**Digestion:** Hunger and apetite; digestion and absorption of carbohydrates, proteins and lipids. **Respiration:** Physiology of respiration – exchange of gases; Transport of oxygen, oxygen dissociation curve-Bohr's effect, Transport of carbon dioxide – chloride shift, respiratory quotient; Cellular respiration: Glycolysis, Kreb's cycle, oxidative phosphorylation, energy budget.	08	Lectures/Videos / Seminars/ Group discussion/ Assignment
03.	**Circulation:** Structure and functions of human heart, regulation of heart beat, blood pressure, Mechanism of blood clotting. **Nitrogen Excretion:** Types of nitrogen excretion- Definition and examples of ammonotelism, ureotelism, uricotelism and gaunotelism; Ornithine cycle, nitrogen excretion in relation to water economy, physiology of urine formation in man.	08	Lectures/Videos / Seminars/ Group discussion/ Assignment

04.	**Neurophysiology**: Structure of multipolar neuron,Types of neurons and neuro-synapses, Membrane potentials (resting and action), Axonic and synaptic transmission of nerve impulses. **Muscle Physiology**: Types of muscles- Morphological (Striated and non-striated) and functional (voluntary and involuntary); Structure and mechanism of contraction of skeletal muscle (Initiation, contractile and regulatory proteins, sliding filament theory, energy for contraction), neuro-muscular junction.	08	Lectures/Videos / Seminars/Group discussion/ Assignment
05.	**Gametogenesis:** Spermatogenesis – formation of spermatids, spermiogenesis. Oogenesis, type of eggs – based on quantity and distribution of yolk with examples. Egg membranes. **Fertilization:** Details of the process with reference to sea urchin – approach of gametes, role of fertilizin and antifertilizin, gamones and their role, activation, penetration, reaction of the egg and amphimixis, monospermy and polyspermy (physiological and pathological), significance of fertilization.	07	Lectures/Videos / Seminars/Group discussion/ Assignment
06.	**Parthenogenesis:** Cytology of natural parthenogenesis – arrhenotoky, thelytoky (amictic and apomictic) and cyclical parthenogenesis with examples,; Artificial parthenogenesis – Loeb's and Bataillon's experiments, Significance of parthenogenesis, a brief notecloning.	05	Lectures/Videos / Seminars/Group discussion/ Assignment
07.	**Cleavage:** Types of cleavage – holoblastic, meroblastic, radial, spiral and superficial types with examples; Planes of cleavage – meridonal, vertical, equatorial and latitudinal. **Development of frog:** Cleavage, blastula, gastrulation, neurulation, fatemaps; Organizer phenomenon – definition, Experiment of Spemann and Mangold, Potencies of the dorsal lip of the blastopore of amphibian gastrula; Definitions of competence, determination and differentiation	07	Lectures/Videos / Seminars/Group discussion/ Assignment
08.	**Development of chick:** Structure of hen's egg, cleavae, blastula, gastrulation – origin and development of primitive streak; **Foetal Membranes:** Development, structure and functions of amnion, chorion, yolk sac and allantois. **Placenta:** Histological and morphological classification with examples. Placental hormones.	07	Lectures/Videos / Seminars/ Group discussion/ Assignment
09.	**Human Development:** Structure of mature spermatozoan, Graafian follicle, ovulation, fertilization, morula, blastocyst, implantation, gastrulation; Organogenesis – outlines of derivatives of different germ layers.	07	Lectures/Videos / Seminars/Group discussion/ Assignment

Sl.No.	List of labs to be conducted 64 Hrs
01.	Salivary amylase activity assay.
02.	Dehydrogenase activity assay in milk.
03.	Estimation of proteins by colorimetric method- Biuret method.
04.	Detection of nitrogenous excretory wastes in the given samples: Ammonia- Nessler's reagent test, Urea- Urease test and Uric acid- Folin's test.
05.	Detection of abnormal excretion of glucose, albumin and creatinine in human urine. Glucose- Benedict's test, albumin- Heller's ring test, Creatinine- Jaffe's test.
06.	Blood typing- A, B, AB, O and Rh factors in given human blood samples using antisera. Preparation of haematin crystals.
07.	Analysis of amino acids by Paper chromatography- demonstration.
08.	Total RBC count, differential count of WBC, Hb count, clotting time- Demonstration.
09.	Electrophoresis- demonstration.
10.	Identification of the sources of different fat soluble and water-soluble vitamins, their role and deficiency diseases (Sources have to be specified, avoiding overlapping ones).
11.	Study of different types of eggs – Graafian follicle, frog's egg, hen's egg and insect egg. Study of grasshopper, frog and mammalian sperms.
12.	Frog: cleavage stages, blastula (section), gastrula (yolk plug stage) and neurula (sections)
13.	Chick embryo: 18 hrs. 24 hrs. 36 hrs. and 48 hrs (WM and sections).
14.	Study of development - Hen's egg – window technique.
15 & 16	Study of Developmental stages in *Drosophila* – egg, larva and pupa.

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LESSION PLAN FOR THE ACADEMIC YEAR 2021-22

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Paper name: BIOCHEMISTRY AND APPLIED ZOOLOGY (ELECTIVE 1)

Programme : B.Sc. (CBCS)
Class : V SEM **Total Hours: 64 hours**
Name of the faculty : MN, KMR and UA
Duration : October to February

Sl.No.	Particulars	No. of Lecture Hours	Methodology/pedagogy
01.	**Carbohydrates**: Definition and classification: biological importance of monosaccharaides (glucose, fructose, ribose, deoxyribose), disachharides (sucrose, lactose, maltose), and polysachharides (homopolysachharides- starch, glycogen, dextrin and heteropolysachharides-heparin, chondrotin sulphate, hyaluronic acid, glucoronic acid). **Proteins**: Elementary classification of amino acids: Simple and conjugated proteins with examples; Primary, secondary, tertiary and quaternary structure of proteins with haemoglobin as example, Biological importance of proteins. **Lipids:** Defination and classification; biological importance of phospholipids, neutral lipids and Glycolipids; Clinical importance of lipids- lipid profile of blood.	12	Lectures/Videos / Seminars/ Group discussion/ Assignment
02.	**Nucleic Acids**: Classification and structure of DNA and RNA. Watson and Crick model of DNA, cloverleaf model of t-RNA. **Enzymes:** Classification, properties, mechanism of enzyme action-induced fit theory; factors affecting enzyme action**,** Co enzymes and inhibitors**,** biological importance of enzymes. **Vitamins:** Classification; Source, importance, daily recommended dosage and deficiency diseases of fat soluble and water soluble vitamins.	12	Lectures/Videos / Seminars/Group discussion/ Assignment
	APPLIED ZOOLOGY		
01.	Purposes and definitions of poultry, dairy, piggery, fishery, vermiculture, apiculture, pearl culture and aquaculture Sericulture: Morphology and life cycle of *Bombyx mori*, rearing up	12	Lectures/Videos / Seminars/Group discussion/ Assignment

	to cocoon stage, non- mulberry silkworms. Vermiculture**:** Types of vermiculture**,** Different species of earthworms used for vermiculture. Composition of vermicompost and its importance. Culture practice of Indian major carps, Pearl formation.		
02.	**Pests, Parasites and Vectors** 1. Insects as pests – on food (cereals, pulses, coffee,) and vegetable (Cauli flower) crops . (One example for each with description of part of the plant affected and economic loss) 2.Parasitic protozoa (entamoeba), nematodesAnclyostoma), helminthes(tape worm) and their human diseases (symptoms of diseases, mode of transmission, control measures) 3.Vectors: Mosquitoes, ticks, mites, cockroaches, rat and their human diseases. (vector species, mode of transmission, control measures)	10	Lectures/Videos / Seminars/Group discussion/ Assignment
03.	**Wild life** **a.** Uniqueness of Indian wildlife**,** Important fauna of Indian forests**;** **b.** Endangered, threatened, vulnerable, rare and extinct species (definitions with examples), Red data book, green data book. **c.** Biodiversity hotspots- meaning, Salient features of biodiversity hotspots of India (number of plant and animal species, endemic species to be highlighted)	10	Lectures/Videos / Seminars/Group discussion/ Assignment
04.	**Biostatics** Introduction – tabulation of data. Bar diagram, Histogram. Frequency distribution – mean, median and mode. Standard deviation and standard error. Chi-square test with problems.	08	Lectures/Group discussion/ Assignment

Sl.No.	List of labs to be conducted 64 Hrs
01.	Qualitative tests to detect carbohydrates in the given test samples- Molisch's test, Iodine test, Fehling's test and Picric acid test.
02.	Qualitative tests to detect proteins in the given test samples- Biuret test, Ninhydrin test, Millon's test and Xanthoproteic test.
03.	Qualitative tests to detect lipids in the given test samples- Acrolin test, Sudan 3 test, Salkowasky test.
04.	Detection of normal and abnormal constituents of urine.
05.	Demonstration of Vermiculture in the laboratory or college campus.
06.	Morphology and life history of *Bombyx mori*.
07.	Identification and uses of different equipment in silkworm rearing.
08.	Morphology of different species of locally available honey bee species and enlisting their foraging plants
09.	Identification of different local food fishes (any five).
10.	Collection of data such as height, weight, blood groups, etc. among students and calculation – mean, standard deviation and errors,. Construction of graph, histograms and bar diagrams using data obtained. (A minimum of two sets of data for each of statistical calculation)
11.	Field oriented projects – to be changed every year: i) Visit to Vermiculture farm/silkworm rearing center /Fish farm/ Dairy/ Poultry/ Zoo/ wildlife sanctuary for on the spot study of culture practice and a report to be submitted .
12.	ii) Enlisting different invertebrate/vertebrate fauna in the college campus/ town/ nearby hill/farms. Study may focus on particular group eg. birds, reptiles, insects, etc. A detailed report on their taxonomic position, habitat preference etc. has to be prepared. Two reports, one from each section has to be submitted for assessment.

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LESSION PLAN FOR THE ACADEMIC YEAR 2021-22

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Paper name: SEC 1: APICULTURE

Programme : B.Sc. (CBCS)
Class : V SEM (Skill enhancement course) **Total Hours: 32 hours**
Name of the faculty : MN, KMR and UA
Duration : October to February

Sl.No	Particulars	No. of Lecture Hours	Methodology/pedagogy
01.	**Biology of Bees** History, classification and biology of honey bees. Social organization of bee colony, honey bee foraging plants	05	Lectures/Videos / Seminars/ Group discussion/ Assignment
02.	**Rearing of Bees** Artificial Bee rearing (Apiary), Beehives – Newton and Langstroth Bee Pasturage Selection of Bee species for Apiculture Bee keeping equipment. Methods of extraction of honey (Indigenous and Modern).	12	Lectures/Videos / Seminars/ Group discussion/ Assignment
03.	**Diseases and Enemies** Bee diseases and enemies. Control and preventive measures	5	Lectures/Videos / Seminars/ Group discussion/ Assignment
04.	**Bee economy** Products of Apiculture industry and its uses (honey, bee wax, propolis), pollen, etc.	4	Lectures/Videos / Seminars/Group discussion/ Assignment
05.	**Entrepreneurship in Apiculture** Bee keeping industry – recent efforts, modern methods in employing artificial Bee hives for cross pollination in horticultural gardens.	6	Lectures/Videos / Seminars/Group discussion/ Assignment