Government Arts College for Men, Krishnagiri-635001

PG & Research Department of Zoology

Program Outcome

M.Sc. Zoology

2015 -16

FUNCTIONAL MORPHOLOGY OF INVERTEBRATES AND CHORDATES

(Protozoans and Parazoans, Radiates, Acoelomates, Pseudocoelomates and Eucoelomates, Pisces and Tetrapodss)

Learning Objective

- To understand the animal kingdom .
- 2. To understand the taxonomic position of protozoa to helminthes.
- To understand the general characteristics of animals belonging to protozoa to helminthes.
- To understand the body organization of phylum from protozoa to helminthes.
- To understand the origin and evolutionary relationship of different phylum from protozoa to helminthes.

Learning Outcomes

1. Student should be able to describe unique characters of protozoa, porifera, coelenterate and helminthes.

2. Student should be able to recognize life functions of protozoa, porifera, coelenterate and helminthes.

3. To recognise the ecological role of phylum protozoa, porifera, coelenterate and helminthes.

4. To recognise the diversity from protozoa, porifera, coelenterate and helminthes

CELL AND MOLECULAR BIOLOGY AND BIOPHYSICS – II

(Cell Structure, Chromosomes, Nucleic Acids and Their Functions, Bioinstrumentation, Radiobiology)

Learning objective:

- To understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
- To understand how these cellular components are used to generate and utilize energy in cells
- To understand the cellular components underlying mitotic cell division.
- To understand responses to environmental or physiological changes, or alterations of cell function brought about by mutation.
- To understand the process of cell division in both somatic and germ cell

LearningOutcome

- Able to describe the function and the composition of the plasma membrane.
- Able to explain the principles of the cell theory.
- Able to Differentiate between prokaryotes and eukaryotes.
- Able to understand the importance of the nucleus and its components.
- Able to understand how the endoplasmic reticulum and Golgi apparatus interact with one another and know with which other organelles they are associated.
- Able to identify the three primary components of the cell's cytoskeleton and how they affect cell shape, function, and movement.

Core Course –III

ADVANCED GENETICS

(Molecular Genetics, Regulation of Gene action, Chromosome and Genetics Disorders, Genes in Development and Population genetic)

Learning objective

- To understand how the behavior of chromosomes during meiosis can explain mendal law. 2. To understand how inheritance patterns are affected by position on chromosomes.
- To understand the similarities and differences between how genetic information is passed on in prokaryotes and eukaryotes.
- To understand gene interactions.
- To understand the chemical nature of heredity

Learning out come

- Comprehensive and detailed understanding of the chemical basis of heredity.
- Understanding about the role of genetics in evolution.
- The ability to evaluate conclusions that are based on genetic data.
- The ability to understand results of genetic experimentation in animals
- Do research and also get hands-on training in herbarium taxonomy through the process of preserving the plant specimens for herbarium which is a biological tool and store house of plants for taxonomic research.
- Examine the recent developments in the field of plant systematic and reflect upon the learning programs related to net based applications which will make the students amused towards the subject.

Core Course –IV

BASIC CONCEPTS OF MICROBIOLOGY AND IMMUNOLOGY

(General Microbiology, Medicinal Microbiology, Agro – Microbiology, Innate and Cellular Immunity and Antigens)

Learning objective

- Learning Outcomes have been defined and courses that satisfy each of these learning outcomes have been identified as listed below in Sections A and B respectively.

Learning out come

1. Define/explain within multiple microbiology disciplines the core theories and practices;
2. Describe/explain the processes used by microorganisms for their replication, survival, and interaction with their environment, hosts, and host populations;
3. Explain the theoretical basis of the tools, technologies and methods common to microbiology; and
4. Demonstrate practical skills in the use of tools, technologies and methods common to microbiology, and apply the scientific method and hypothesis testing in the design and execution of experiments.
5. evaluate and respond to a complex question or challenge, using perspectives and scholarship drawn from microbiology and from cognate and non-cognate fields;
6. construct a summative project or paper that draws on current research, scholarship and/or techniques in microbiology.

Core Course-V

Practical-I

FUNCTIONAL MORPHOLOGY OF INVERTEBRATES AND CHORDATES, CELL AND MOLECULAR BIOLOGY AND BIOPHYSICS, ADVANCED GENETICS AND MICROBIOLOGY AND IMMUNOLOGY

Learning Objectives

1. To know the Functional Morphology of Invertebrates and Chordates
2. To study the Identification and study of selected Protozoan and Helminthes of medical importance.
3. To Identification and study the Trochophore larva, Nauplius larva, Zoea larva and Bipinnaria larva.
4. To dissect the nervous system of Prawn.
5. To mount the mouth parts of Honey bee, Housefly and Mosquito.
6.

Learning Outcomes

1. Gain the knowledge on Functional Morphology of Invertebrates and Chordates
2. Knowledge on Protozoan and Helminthes and their medical importance.
3. Knowledge on various various larva like Trochophore larva, Nauplius larva, Zoea larva and Bipinnaria larva.
7. Gain the knowledge of nervous system of Prawn, mouth parts of Honey bee, Housefly and Mosquito

4. Elective Course I

ELECTIVE – I FIRST AID AND HOME NURSING

Learning Objectives

1. To know the Principles of first aid. Signs and symptoms and first aid for Snake bites, Dog bites, Insect bites.
2. To study the Fracture, Causes, Types, Signs and Symptoms. First Aid - Treatment. Effects of Heat, Heat Stroke, Signs and Symptoms and First Aid.
3. To know the Home Nursing - observation of patients condition, importance of habit observation, Clinical Thermometer and its uses. Counting of pulse, Respiration, how to count respiratory rate.
4. To know the Normal and Abnormal Blood Pressure, Specific Infectious Discases. Method of Nursing.
5.

Learning Outcomes

1. Gain the knowledge on first aid
2. Gain the Knowledge about first aid and treatment.
3. Knowledge on Normal and Abnormal Blood Pressure, Specific Infectious Discases
4. Knowledge about Method of Nursing.

SECOND SEMESTER

CORE – V - BIOSTATISTICS AND COMPUTER APPLICATIONS

Learning objective

- Know the theory behind fundamental bioinformatics analysis methods.
- 2. be familiar with widely used bioinformatics databases.
- 3. Know basic concepts of probability and statistics.
- Able to describe statistical methods and probability distributions relevant for molecular biology data.
- Know the applications and limitations of different bioinformatics and statistical methods. 6. be able to perform and interpret bioinformatics and statistical analyses with real molecular biology data.

Learning outcome:

EXTRA DISCIPILINARY COURSE (EDC)

SECOND SEMESTER

POULTRY FARMING

Learning objective

- To provide self employment opportunities and knowledge for students.

- To understand poultry industry based on the past, present and emphasis of future growth
- To make the students to develop knowledge on the history and the role of poultry in rural development and its structure.
- Students can learn the methods of rearing, breeding and production of poultry and marketing.

Learning outcome

On successful completion of the course the students can able to

- The graduate can explain the scope and future prospectus of poultry industry.
- The student can brief about the daily work in poultry farm activities.
- He will neatly explain the brooders, breeding methods and vaccinations in poultry farms.
- The students are exposed to prepare poultry feed using different ingredients and symptoms of various diseases that affects poultry farms.
- The graduate gain knowledge about getting bank and government funds regarding poultry farms.

HUMAN RIGHTS

Learning objective

1. To describe specific theoretical, conceptual and practical challenges facing the fields of human rights law and sustainable development, adopting an interdisciplinary approach.

2. To articulate critical analysis on the relationship between respect for human rights and sustainable development.
3. To use the analytical and presentation skills covered in the course for developing teamwork and integration of a gender perspective for sustainable development and the protection of human rights.
4. To build networks among students, organizers and experts, from Flanders, the Global South and North.
5. To critically evaluate actors and processes involved in law and development initiatives in a globalized world, both from an 'external' (the transnational actors involved) and an 'internal' (the developing country and its inhabitants) perspective.

Learning outcome

- understand the historical growth of the idea of human rights
- demonstrate an awareness of the international context of human rights
- demonstrate an awareness of the position of human rights in the UK prior to 1998
- understand the importance of the Human Rights Act 1998
- analyse and evaluate concepts and ideas.

CORE – VIII
DEVELOPMENTAL BIOLOGY

Learning objective

- To understand the basic concepts of developmental biology.
- To learn the cellular and tissue level events happens in gametogenesis.

- To acquire basic knowledge on organogenesis in related to development anddifferentiation. To understand the regeneration in development of immune system in vertebrates.
- To gain knowledge about various modern reproductive techniques in related to male and female infertility.

Learning outcome

On successful completion of the course, the students will able to

- Understand the cellular and molecular level developments of organisms.
- Students will gain knowledge on gametogenesis and embryological development.
- Students will acquire knowledge about organ formation and their development during embryology.
- Know various stages of regeneration mechanism happen in embryo and adults.
- To understand the modern embryological techniques in related to male and female infertility

CORE – IX
BASIC CONCEPT OF BIOTECHNOLOGY

Learning objective

• To understand principles of animal culture, media preparation .

• To explain Invitro fertilization and embryo transfer technology.

• To describe meristem culture and clonal propagation of plants on a commercial scale.

• To get insight in applications or recombinant DNA technology in agriculture, production of therapeutic proteins.

• To describe commercial production of fuels, microbial enzymes.

• To explain the microbial degradation of pesticides, Bioremediation& Biofertilizers.

Learning outcome

- Have good knowledge of the morphology and functions of the human organism;
- know the cellular and molecular aetiopathogenesis of the most relevant human pathologies
- Know the congenital or acquired pathological conditions in which it is possible to intervene with a biotechnological approach;
- Know the clinical diagnostic process of the main human diseases, including applied technologies.

CORE – X

ANIMAL PHYSIOLOGY

Learning objective

- To understand the physiological functions of animal parts in related to its habitat.
- To study the osmoregulatory mechanism of animals.
- To understand the respiratory physiology of both terrestrial and aquatic forms.
- To know the excretory and endocrine system in the animals.
- To learn the neuromuscular coordination in animals.

Learning outcome

On successful completion of the course the student will able to

- Adaptive nature of animals in related to their habitat.
- Osmoregulatory behaviour of animals in relation to stress, changes in environmental conditions.
- Basic mechanism of respiratory organs
- Learn about the excretory and endocrine system in animals. CO5: Understand the neuromuscular interactions in animals.

CORE – XI

OPTIONAL SUBJECT – I

GENERAL AND APPLIED ENTOMOLOGY

Learning objective

- To study the external morphology, anatomy, physiology and behaviour ofinsects and their position in animal kingdom by studying their taxonomiccharacters up to order.
- To know about the economic entomology and special adaptation of insects

Learning outcome

On successful completion of the course the student can able to

- Classify the insects up to order level.
- Explain the morphology and system of insects.
- Understand the various internal systems of the insects.
- Students can acquire knowledge about Sericulture, Apiculture and Lac culture techniques.
- Briefly gain knowledge on pest and its management methods.

CORE – PRACTICAL – III

DEVELOPMENTAL BIOLOGY, BIOTECHNOLOGY, ANIMAL PHYSIOLOGY AND GENERAL AND APPILED ENTOMOLOGY (OPTIONAL SUBJECT-I

- To Determinate the Salt loss and Salt gain in Fish / Crab.
- To determination the Respiratory Quotient in aquatic animal in relation to Light (Fish /crab). Blastoderm
- To mount the Chick embryo. Problems related to Mean, Standard Deviation, Chi-square test.

Learning objective

- To gain knowledge on determination of Salt loss and Salt gain in Fish / Crab.
- Know Respiratory Quotient in aquatic animal in relation to Light (Fish /crab). Blastoderm
- Knowledge on mount the Chick embryo. Problems related to Mean, Standard Deviation, Chi-square test.

ELECTIVE – III

ENDOCRINOLOGY

Learning objective

- To explain the roles of the endocrine system in maintaining homeostasis, integrating growth and development, responding to environmental insults and promoting successful reproduction.
- To discuss the definition of a hormone in terms of its general properties.
- To differentiate among endocrine, paracrine and autocrine systems.
- To describe the different classes and chemical structures of hormones.
- To identify the glands, organs, tissues and cells that synthesize and secrete hormones, hormone precursors and associated compounds.
- To describe the synthesis and modes of secretion of hormones.
- To explain how the secretion of hormones is regulated, including the principles of negative and positive feedback mechanisms.
- To explain the importance of patterns of hormone secretion such as pulsatile, diurnal and cyclicle.

Learning outcome

- Know the properties of polypeptide structure hormones.
- Know the properties of steroid structure hormones.
- Gain knowledge on basic principles of homeostatic regulation of biological systems;
- know the structures and biosynthetic pathways of major families of chemical messengers; recognize the diversity of hormone receptor systems and transduction pathways;
- Acquire a systems-based working knowledge of important hormonallyregulated physiological processes;
- Appreciate current scholarly and popular issues in endocrinology; and
- Able to find and access primary literature resources, and to synthesize current knowledge in reporting on a topic of endocrinological interest.

CORE – XII

Evolution

Learning objective

The course will give the student knowledge about evolutionary processes and skills• in evolutionary analysis

- To study molecular evolution and the history of life
- To emphasize the historical nature of evolutionary biology and the evolutionary concepts.

Learning outcome

- CO1: Students learn how evolution is the central theoretical explanation for all of life, for all its diversity of form and function.
- Students learn that evolution is a significant part of understanding who we are as humans.
- Students learn practical skills like constructing phylogenetic trees.
- Describe the molecular methods to study genetic variation within and between species.

CORE – XIV: OPTIONAL SUBJECT – II

SERICULTURE

Learning objective

- To study the external morphology, anatomy, physiology and behaviour ofinsects and their position in animal kingdom by studying their taxonomiccharacters up to order.
- To explain the potentialities of sericulture as a source of rural employment and as an export earning enterprise;
- To differentiate different silkworms and their host plants; ”
- To determine various support systems available to strengthen sericulture; and ” identify the organizations involved in sericulture training and skill upgradation.
- To know about the economic entomology and special adaptation of insects•

Learning outcome

- Classify the insects up to order level. CO2: Explain the morphology and system of insects.
- Understand the various internal systems of the insects.
- Students can acquire knowledge about Sericulture, Apiculture and Lac culture techniques.
- Briefly gain knowledge on pest and its management methods.

CORE – PRACTICAL – IV
EVOLUTION, MEDICAL LABORATORY TECHNIQUES, SERICULTURE (OPTIONAL SUBJECT - II) AND MOICROTECHNIQUE

Learning objective

- To Study of Fossils (Ammonoids, Nautiloids & Echinoderm fossils
- To Estimation of Haemoglobin (Hb) and Erythrocyte Sedimentation Rate (ESR).
- To Identification of common mulberry varieties and their features.
- To Identification of important pest and diseases of silkworm Bombyx mor

Learning outcome

- Gain knowledge on Fossils (Ammonoids, Nautiloids & Echinoderm fossils).
- Knowledge on Blood – clotting time, bleeding time – Preparation of Haematin crystals.
- Know Staining procedure for prepared slides.
- Gain knowledge on Various stages of larva and their identification in Bombyx mori.

ELECTIVE – IV
ECONOMIC ZOOLOGY

Learning objective

- To know the Morphology and Biology of honey bees
- To know the Medicinal value of honey
- To know Importance of bee colonies in crop pollination.

Learning outcome

- Aware students about knowledge and skill in the fundamentals and systematics of animal kingdom.
- Gain knowledge of anatomical structure and various metabolic functions of organisms.
- Understand various physiological processes at molecular level of animals from different phyla.
- Information and skill of advanced biological techniques for experimental purpose.
- Awareness about environment and its conservation processes,• pollution control and its importance and.
- Gain knowledge of protection of vulnerable and endangered species

Government Arts College for Men, Krishnagiri-635001

PG & Research Department of Zoology

Program Outcome

M.Sc. Zoology

2016 -17

FUNCTIONAL MORPHOLOGY OF INVERTEBRATES AND CHORDATES

(Protozoans and Parazoans, Radiates, Acoelomates, Pseudocoelomates and Eucoelomates, Pisces and Tetrapodss)

Learning Objective

- To understand the animal kingdom .
- 2. To understand the taxonomic position of protozoa to helminthes.
- To understand the general characteristics of animals belonging to protozoa to helminthes.
- To understand the body organization of phylum from protozoa to helminthes.
- To understand the origin and evolutionary relationship of different phylum from protozoa to helminthes.

Learning Outcomes

1. Student should be able to describe unique characters of protozoa, porifera, coelenterate and helminthes.

2. Student should be able to recognize life functions of protozoa, porifera, coelenterate and helminthes.

3. To recognise the ecological role of phylum protozoa, porifera, coelenterate and helminthes.

4. To recognise the diversity from protozoa, porifera, coelenterate and helminthes

CELL AND MOLECULAR BIOLOGY AND BIOPHYSICS – II

(Cell Structure, Chromosomes, Nucleic Acids and Their Functions, Bioinstrumentation, Radiobiology)

Learning objective:

- To understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
- To understand how these cellular components are used to generate and utilize energy in cells
- To understand the cellular components underlying mitotic cell division.
- To understand responses to environmental or physiological changes, or alterations of cell function brought about by mutation.
- To understand the process of cell division in both somatic and germ cell

LearningOutcome

- Able to describe the function and the composition of the plasma membrane.
- Able to explain the principles of the cell theory.
- Able to Differentiate between prokaryotes and eukaryotes.
- Able to understand the importance of the nucleus and its components.
- Able to understand how the endoplasmic reticulum and Golgi apparatus interact with one another and know with which other organelles they are associated.
- Able to identify the three primary components of the cell's cytoskeleton and how they affect cell shape, function, and movement.

Core Course –III

ADVANCED GENETICS

(Molecular Genetics, Regulation of Gene action, Chromosome and Genetics Disorders, Genes in Development and Population genetic)

Learning objective

- To understand how the behavior of chromosomes during meiosis can explain mendal law. 2. To understand how inheritance patterns are affected by position on chromosomes.
- To understand the similarities and differences between how genetic information is passed on in prokaryotes and eukaryotes.
- To understand gene interactions.
- To understand the chemical nature of heredity

Learning out come

- Comprehensive and detailed understanding of the chemical basis of heredity.
- Understanding about the role of genetics in evolution.
- The ability to evaluate conclusions that are based on genetic data.
- The ability to understand results of genetic experimentation in animals
- Do research and also get hands-on training in herbarium taxonomy through the process of preserving the plant specimens for herbarium which is a biological tool and store house of plants for taxonomic research.
- Examine the recent developments in the field of plant systematic and reflect upon the learning programs related to net based applications which will make the students amused towards the subject.

Core Course –IV

BASIC CONCEPTS OF MICROBIOLOGY AND IMMUNOLOGY

(General Microbiology, Medicinal Microbiology, Agro – Microbiology, Innate and Cellular Immunity and Antigens)

Learning objective

- Learning Outcomes have been defined and courses that satisfy each of these learning outcomes have been identified as listed below in Sections A and B respectively.

Learning out come

5. Define/explain within multiple microbiology disciplines the core theories and practices;
6. Describe/explain the processes used by microorganisms for their replication, survival, and interaction with their environment, hosts, and host populations;
7. Explain the theoretical basis of the tools, technologies and methods common to microbiology; and
8. Demonstrate practical skills in the use of tools, technologies and methods common to microbiology, and apply the scientific method and hypothesis testing in the design and execution of experiments.
7. evaluate and respond to a complex question or challenge, using perspectives and scholarship drawn from microbiology and from cognate and non-cognate fields;
8. construct a summative project or paper that draws on current research, scholarship and/or techniques in microbiology.

Core Course-V

Practical-I

FUNCTIONAL MORPHOLOGY OF INVERTEBRATES AND CHORDATES, CELL AND MOLECULAR BIOLOGY AND BIOPHYSICS, ADVANCED GENETICS AND MICROBIOLOGY AND IMMUNOLOGY

Learning Objectives

8. To know the Functional Morphology of Invertebrates and Chordates
9. To study the Identification and study of selected Protozoan and Helminthes of medical importance.
10. To Identification and study the Trochophore larva, Nauplius larva, Zoea larva and Bipinnaria larva.
11. To dissect the nervous system of Prawn.
12. To mount the mouth parts of Honey bee, Housefly and Mosquito.
13.

Learning Outcomes

5. Gain the knowledge on Functional Morphology of Invertebrates and Chordates
6. Knowledge on Protozoan and Helminthes and their medical importance.
7. Knowledge on various various larva like Trochophore larva, Nauplius larva, Zoea larva and Bipinnaria larva.
14. Gain the knowledge of nervous system of Prawn, mouth parts of Honey bee, Housefly and Mosquito

8. Elective Course I

ELECTIVE – I FIRST AID AND HOME NURSING

Learning Objectives

6. To know the Principles of first aid. Signs and symptoms and first aid for Snake bites, Dog bites, Insect bites.
7. To study the Fracture, Causes, Types, Signs and Symptoms. First Aid - Treatment. Effects of Heat, Heat Stroke, Signs and Symptoms and First Aid.
8. To know the Home Nursing - observation of patients condition, importance of habit observation, Clinical Thermometer and its uses. Counting of pulse, Respiration, how to count respiratory rate.
9. To know the Normal and Abnormal Blood Pressure, Specific Infectious Discases. Method of Nursing.
10.

Learning Outcomes

5. Gain the knowledge on first aid
6. Gain the Knowledge about first aid and treatment.
7. Knowledge on Normal and Abnormal Blood Pressure, Specific Infectious Discases
8. Knowledge about Method of Nursing.

SECOND SEMESTER

CORE – V - BIOSTATISTICS AND COMPUTER APPLICATIONS

Learning objective

- Know the theory behind fundamental bioinformatics analysis methods.
- 2. be familiar with widely used bioinformatics databases.
- 3. Know basic concepts of probability and statistics.
- Able to describe statistical methods and probability distributions relevant for molecular biology data.
- Know the applications and limitations of different bioinformatics and statistical methods. 6. be able to perform and interpret bioinformatics and statistical analyses with real molecular biology data.

Learning outcome:

EXTRA DISCIPILINARY COURSE (EDC)

SECOND SEMESTER

POULTRY FARMING

Learning objective

- To provide self employment opportunities and knowledge for students.

- To understand poultry industry based on the past, present and emphasis of future growth
- To make the students to develop knowledge on the history and the role of poultry in rural development and its structure.
- Students can learn the methods of rearing, breeding and production of poultry and marketing.

Learning outcome

On successful completion of the course the students can able to

- The graduate can explain the scope and future prospectus of poultry industry.
- The student can brief about the daily work in poultry farm activities.
- He will neatly explain the brooders, breeding methods and vaccinations in poultry farms.
- The students are exposed to prepare poultry feed using different ingredients and symptoms of various diseases that affects poultry farms.
- The graduate gain knowledge about getting bank and government funds regarding poultry farms.

HUMAN RIGHTS

Learning objective

6. To describe specific theoretical, conceptual and practical challenges facing the fields of human rights law and sustainable development, adopting an interdisciplinary approach.

7. To articulate critical analysis on the relationship between respect for human rights and sustainable development.
8. To use the analytical and presentation skills covered in the course for developing teamwork and integration of a gender perspective for sustainable development and the protection of human rights.
9. To build networks among students, organizers and experts, from Flanders, the Global South and North.
10. To critically evaluate actors and processes involved in law and development initiatives in a globalized world, both from an 'external' (the transnational actors involved) and an 'internal' (the developing country and its inhabitants) perspective.

Learning outcome

- understand the historical growth of the idea of human rights
- demonstrate an awareness of the international context of human rights
- demonstrate an awareness of the position of human rights in the UK prior to 1998
- understand the importance of the Human Rights Act 1998
- analyse and evaluate concepts and ideas.

CORE – VIII
DEVELOPMENTAL BIOLOGY

Learning objective

- To understand the basic concepts of developmental biology.
- To learn the cellular and tissue level events happens in gametogenesis.

- To acquire basic knowledge on organogenesis in related to development anddifferentiation. To understand the regeneration in development of immune system in vertebrates.
- To gain knowledge about various modern reproductive techniques in related to male and female infertility.

Learning outcome

On successful completion of the course, the students will able to

- Understand the cellular and molecular level developments of organisms.
- Students will gain knowledge on gametogenesis and embryological development.
- Students will acquire knowledge about organ formation and their development during embryology.
- Know various stages of regeneration mechanism happen in embryo and adults.
- To understand the modern embryological techniques in related to male and female infertility

CORE – IX
BASIC CONCEPT OF BIOTECHNOLOGY

Learning objective

• To understand principles of animal culture, media preparation .

• To explain Invitro fertilization and embryo transfer technology.

• To describe meristem culture and clonal propagation of plants on a commercial scale.

• To get insight in applications or recombinant DNA technology in agriculture, production of therapeutic proteins.

• To describe commercial production of fuels, microbial enzymes.

• To explain the microbial degradation of pesticides, Bioremediation& Biofertilizers.

Learning outcome

- Have good knowledge of the morphology and functions of the human organism;
- know the cellular and molecular aetiopathogenesis of the most relevant human pathologies
- Know the congenital or acquired pathological conditions in which it is possible to intervene with a biotechnological approach;
- Know the clinical diagnostic process of the main human diseases, including applied technologies.

CORE – X

ANIMAL PHYSIOLOGY

Learning objective

- To understand the physiological functions of animal parts in related to its habitat.
- To study the osmoregulatory mechanism of animals.
- To understand the respiratory physiology of both terrestrial and aquatic forms.
- To know the excretory and endocrine system in the animals.
- To learn the neuromuscular coordination in animals.

Learning outcome

On successful completion of the course the student will able to

- Adaptive nature of animals in related to their habitat.
- Osmoregulatory behaviour of animals in relation to stress, changes in environmental conditions.
- Basic mechanism of respiratory organs
- Learn about the excretory and endocrine system in animals. CO5: Understand the neuromuscular interactions in animals.

CORE – XI

OPTIONAL SUBJECT – I

GENERAL AND APPLIED ENTOMOLOGY

Learning objective

- To study the external morphology, anatomy, physiology and behaviour ofinsects and their position in animal kingdom by studying their taxonomiccharacters up to order.
- To know about the economic entomology and special adaptation of insects

Learning outcome

On successful completion of the course the student can able to

- Classify the insects up to order level.
- Explain the morphology and system of insects.
- Understand the various internal systems of the insects.
- Students can acquire knowledge about Sericulture, Apiculture and Lac culture techniques.
- Briefly gain knowledge on pest and its management methods.

CORE – PRACTICAL – III

DEVELOPMENTAL BIOLOGY, BIOTECHNOLOGY, ANIMAL PHYSIOLOGY AND GENERAL AND APPILED ENTOMOLOGY (OPTIONAL SUBJECT-I

- To Determinate the Salt loss and Salt gain in Fish / Crab.
- To determination the Respiratory Quotient in aquatic animal in relation to Light (Fish /crab). Blastoderm
- To mount the Chick embryo. Problems related to Mean, Standard Deviation, Chi-square test.

Learning objective

- To gain knowledge on determination of Salt loss and Salt gain in Fish / Crab.
- Know Respiratory Quotient in aquatic animal in relation to Light (Fish /crab). Blastoderm
- Knowledge on mount the Chick embryo. Problems related to Mean, Standard Deviation, Chi-square test.

ELECTIVE – III

ENDOCRINOLOGY

Learning objective

- To explain the roles of the endocrine system in maintaining homeostasis, integrating growth and development, responding to environmental insults and promoting successful reproduction.
- To discuss the definition of a hormone in terms of its general properties.
- To differentiate among endocrine, paracrine and autocrine systems.
- To describe the different classes and chemical structures of hormones.
- To identify the glands, organs, tissues and cells that synthesize and secrete hormones, hormone precursors and associated compounds.
- To describe the synthesis and modes of secretion of hormones.
- To explain how the secretion of hormones is regulated, including the principles of negative and positive feedback mechanisms.
- To explain the importance of patterns of hormone secretion such as pulsatile, diurnal and cyclicle.

Learning outcome

- Know the properties of polypeptide structure hormones.
- Know the properties of steroid structure hormones.
- Gain knowledge on basic principles of homeostatic regulation of biological systems;
- know the structures and biosynthetic pathways of major families of chemical messengers; recognize the diversity of hormone receptor systems and transduction pathways;
- Acquire a systems-based working knowledge of important hormonallyregulated physiological processes;
- Appreciate current scholarly and popular issues in endocrinology; and
- Able to find and access primary literature resources, and to synthesize current knowledge in reporting on a topic of endocrinological interest.

CORE – XII

Evolution

Learning objective

The course will give the student knowledge about evolutionary processes and skills• in evolutionary analysis

- To study molecular evolution and the history of life
- To emphasize the historical nature of evolutionary biology and the evolutionary concepts.

Learning outcome

- CO1: Students learn how evolution is the central theoretical explanation for all of life, for all its diversity of form and function.
- Students learn that evolution is a significant part of understanding who we are as humans.
- Students learn practical skills like constructing phylogenetic trees.
- Describe the molecular methods to study genetic variation within and between species.

CORE – XIV: OPTIONAL SUBJECT – II

SERICULTURE

Learning objective

- To study the external morphology, anatomy, physiology and behaviour ofinsects and their position in animal kingdom by studying their taxonomiccharacters up to order.
- To explain the potentialities of sericulture as a source of rural employment and as an export earning enterprise;
- To differentiate different silkworms and their host plants; ”
- To determine various support systems available to strengthen sericulture; and ” identify the organizations involved in sericulture training and skill upgradation.
- To know about the economic entomology and special adaptation of insects•

Learning outcome

- Classify the insects up to order level. CO2: Explain the morphology and system of insects.
- Understand the various internal systems of the insects.
- Students can acquire knowledge about Sericulture, Apiculture and Lac culture techniques.
- Briefly gain knowledge on pest and its management methods.

CORE – PRACTICAL – IV
EVOLUTION, MEDICAL LABORATORY TECHNIQUES, SERICULTURE (OPTIONAL SUBJECT - II) AND MOICROTECHNIQUE

Learning objective

- To Study of Fossils (Ammonoids, Nautiloids & Echinoderm fossils
- To Estimation of Haemoglobin (Hb) and Erythrocyte Sedimentation Rate (ESR).
- To Identification of common mulberry varieties and their features.
- To Identification of important pest and diseases of silkworm Bombyx mor

Learning outcome

- Gain knowledge on Fossils (Ammonoids, Nautiloids & Echinoderm fossils).
- Knowledge on Blood – clotting time, bleeding time – Preparation of Haematin crystals.
- Know Staining procedure for prepared slides.
- Gain knowledge on Various stages of larva and their identification in Bombyx mori.

ELECTIVE – IV
ECONOMIC ZOOLOGY

Learning objective

- To know the Morphology and Biology of honey bees
- To know the Medicinal value of honey
- To know Importance of bee colonies in crop pollination.

Learning outcome

- Aware students about knowledge and skill in the fundamentals and systematics of animal kingdom.
- Gain knowledge of anatomical structure and various metabolic functions of organisms.
- Understand various physiological processes at molecular level of animals from different phyla.
- Information and skill of advanced biological techniques for experimental purpose.
- Awareness about environment and its conservation processes,• pollution control and its importance and.
- Gain knowledge of protection of vulnerable and endangered species