THE LIST OF COURSES WHICH ADDRESS THE PROFESSIONAL ETHICS GENDER, HUMAN VALUES, ENVIRONMENT AND SUSTAINABILITY

| **SR NO** | **NAME OF COURSES** |
| --- | --- |
| **1** | POLITICAL SCIENCE |
| **2** | M.Com |
| **3** | BOTANY |
| **4** | ENGLISH |
| **5** | ZOOLOGY |
| **6** | ENVIRONMENT SCIENCE |

Class: F.Y.B.A Subject: Political science Course NO. 11161 A

Course name: INTRODUCTION TO INDIAN CONSTITUTION

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Fundamental Rights, Duties and the Directive Principles of States | Nature of Fundamental Rights | Awareness about Gender,Equality,Freedom,and Culture |

Course name: AN INTRODUCTION TO POLITICAL IDEOLOGIES

Class: S.Y.B.A Subject: Political science Course NO. 23164

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Feminism | Feminism in India | Women Empowerment, self-sufficiency, safety, self-defence, to help women deal with common health issues. |
|  | Gandhism | Truth and Non Violence, Theory of Satyagraha | Strength. truth, love, firmness passive resistance |

**Class: M.COM-I (2019 Pattern)**

**Subject name: Business Ethics and Professional Values Course Subject Code: 213**

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Business Ethics and Professional Values | a. Business Ethics – Introduction, Meaning, Scope ,  Principles , importance , Code of Ethics and Theories  b. Professional Values – Meaning , Significance , Scope and  Human Values  c. Ethical Decision Making – Meaning, determinants, process  of ethical decision making | 1. Understanding Knowledge of established  methodologies of solving ethical problems  2. Recognizing significance of Professional Values |
|  | Corporate  Social  Responsibility  and Corporate  Governance | a. CSR – Introduction, advantages, scope for CSR in India,  Legal provisions for CSR, Forms of CSR and Indian  Corporations  b. Corporate Governance – concept Objectives, features,  advantages, code whistle blowing, types arguments and  justification  c. Value Based Management – meaning, benefits and  methods =, Vedic Management for business ethics | 1. Knowing CSR and its scope and forms  2. Analysis of Corporate Governance and Value  Based Management |
|  | Indian Ethical  Practices | a. Indian Ethical Practices Finance  b. Indian Ethical Practices Marketing  c. Indian Ethical Practices Information Technology  d. Ethics at work place  e. Indian Ethical Practices HRM | Recognizing the unethical issues in Finance, Marketing, IT, HRM and at workplace |
|  | Emerging issues  in Business  Ethics and  Environmental  issues | a. Ethics in Environment – environmental crisis, issues relating to environmental degradation, natural resources depletion and pollution  b. Sustainable Development – Meaning, Principles. Goals of Sustainable Development, Strategy to achieve Sustainable Development. | 1. Recognizing environmental issues and its  impact on Business  2. Achieving Sustainable Development |

**Class: M.COM-I SEM I and II (2019 Pattern)**

**Course name: HUMAN RIGHTS AND DUTIES I and II**

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Basic concepts | Human Values,  Dignity Liberty  Equality  Justice  Unity in Diversity  Ethics and Morals | Significance of Values enrich the Individual and social Personality |
|  | Perspectives of Rights and Duties | a) Rights: Inherent-Inalienable Universal- Individual and Groups  b) Nature and concept of Duties  c) Interrelationship of Rights and Duties | Significance of Rights and Duties |
|  | Introduction to Terminology of Various Legal Instruments | Introduction to Terminology of Various Legal Instruments | Know the terminology of Various Legal Instruments |
|  | United Nations And Human Rights | a) Brief History of Human Rights- International and National Perspectives  b) Provision of the charters of United Nations  c) Universal Declaration of Human Rights- Significance-Preamble  d) Civil and Political Rights-(Art. 1-21)  e) Economic, Social and Cultural Rights-(Art.22-28)  f) Duties and Limitations-(Art. 29)  g) Final Provision (Art. 30) | Brief history of United Nations And Human Rights |
| 1 | General Introduction | a) Meaning and Concept of Vulnerable and Disadvantaged  b) Groups, Customary, Socio-Economic and Cultural Problems of  c) Vulnerable and Disadvantaged Groups | Concept of Vulnerable and Disadvantaged |
| 2 | Social status of women and children in International and national perspective | a) Human Rights and Women's Rights –International and National Standards  b) Human Rights of Children-International and National Standards | Know about the social status of women and children in International and national perspective |
| 3 | Status of Social and Economically Disadvantaged people | a) Status of Indigenous People and the Role of the UN  b) Status of SC/ST and Other Indigenous People in the Indian Scenario  c) Human Rights of Aged and Disabled  d) The Minorities and Human Rights | Know about the Status of Social and Economically Disadvantaged people |
| 4 | Human rights of vulnerable groups | a) Stateless Persons  b) Sex Workers  c) Migrant Workers  d) HIV/AIDS Victims | Study about the Human rights of vulnerable groups |

**Class: F.Y.B.Sc.**

Subject: Botany, Course No: Sem I: BO 111-BO 113, Sem II: BO 121 – BO 123

**Class: S.Y.B.Sc.**

Subject: Botany, Course No: Sem I: BO 231 – BO 233, Sem II: BO 241 – BO 243

**Class: T.Y.B.Sc.**

Subject: Botany, Course No: Sem I: BO 351 – BO 3511, Sem II: BO 361 – BO 3611

**F.Y. B.Sc.**

| **Sr. No.** | **Course Title** | **Topics** | **Enrichment** |
| --- | --- | --- | --- |
|  | Plant life and utilization I & II | Plant Diversity, Cryptogams, Phanerogams and their uses | Study of Biodiversity of plants ensures a resource for new food crops, medicines, Plant life balances, its utilization and importance to humans as well as to other living organism in nature |
|  | Plant morphology and Anatomy | External and Internal characters of various parts of plants | Focuses on the morphology and anatomy of plants due to the important role that external and internal plant physical characteristics play during the different stages of the life of a given plant organ |
|  | Principles of plant science | Introduction to plant physiology, Plant growth, Plant cell organelles, Cell cycle | Studies and research on plants enriches our intellectual life and adds to our knowledge about other life processes. The results of research on plant systems also can teach us how to approach problems in agriculture, health, and the environment |

**S.Y. B.Sc.**

| **Sr. No.** | **Course Title** | **Topics** | **Enrichment** |
| --- | --- | --- | --- |
|  | Taxonomy of Angiosperms and Plant Ecology | Classification of angiosperms, and ecological adaptations | Taxonomy helps in placing plants in order, identifying them and naming them.  Ecology involves use of scientific methodology via lab experiments to understands how the different organisms grow, populate, how they interact with other organisms either as parasites, predators, how the organisms die out as well as how they evolve or adapt to changing climatic and environmental situations. |
|  | Plant Physiology | Metabolic activities of plants | Fundamental processes such as [photosynthesis](https://en.wikipedia.org/wiki/Photosynthesis), [respiration](https://en.wikipedia.org/wiki/Cellular_respiration), [plant nutrition](https://en.wikipedia.org/wiki/Plant_nutrition), plant hormone functions, [tropisms](https://en.wikipedia.org/wiki/Tropism), [nastic movements](https://en.wikipedia.org/wiki/Nastic_movements), [photoperiodism](https://en.wikipedia.org/wiki/Photoperiodism), [photomorphogenesis](https://en.wikipedia.org/wiki/Photomorphogenesis), [circadian rhythms](https://en.wikipedia.org/wiki/Circadian_rhythms), environmental stress physiology, seed [germination](https://en.wikipedia.org/wiki/Germination), dormancy and stomata function and transpiration, both parts of plant water relations, are studied by plant physiologists |
|  | Plant Anatomy and Embryology | Internal characters of plants. Developmental stages from zygote formation to seed formation in plants | Focuses on anatomy of plants due to the important role that internal plant parts play in growth and structure building. Embryology helps in understanding growth pattern from embryonic stage till formation of seed to continue life cycle |
|  | Plant Biotechnology | Various techniques used in modern biological research | Plant biotechnology involves knowledge on breeding to improve plants for various reason such as increasing yield and quality, heat and drought resistance, resistance to phytopathogens, herbicide and insect resistance, increasing biomass for biofuel production, and enhancing the nutritional quality of the crops. Also biotechnology is most important for its implications in health and medicine. |

**T.Y. B.Sc.**

| **Sr. No.** | **Course Title** | **Topics** | **Enrichment** |
| --- | --- | --- | --- |
| 1. | Cryptogamic Botany ( Algae and Fungi)-y | Cryptogams- meaning. Types- Lower Cryptogams, brief Review with example | General characters, distribution, Thallus organization, habit and Habitat reproduction and Classification (G.M.Smith 1955) up to classes. Fungi: General characters, Habit and habitats, thallus organization, cell wall composition, nutrition and Classification. (Alexopoulos and Mims 1979) up to classes. |
| 2. | ArchegoniSpermatophyta and Paleobotanyate | Introduction to Archegoniate | Introduction, general characters, distribution of Bryophytes to land habit, classification of Bryophytes according to G.M. Smith (1955) up to classes with reasons.Introduction, Vascular Cryptogams, General characteristics, Classification according to K.R. Sporne (1975) up to classes with reasons, Diversity and Distribution of Pteridophytes |
| 3. | Spermatophyta and Paleobotany | Functions of Herbarium, Important herbaria | Outline, Merit and Demerits of Cronquist’s System and APG IV system of classification. Study of following families with reference to systematic position (As per Bentham & Hooker), Diagnostic characters, floral formula, floral diagram and any five examples with their economic importance – Nymphaeaceae, Oleaceae, Amaranthaceae, Cannaceae |
| 4. | Plant Ecology | Ecological study | Ecology involves use of scientific methodology via lab experiments to understands how the different organisms grow, populate, how they interact with other organisms either as parasites, predators, how the organisms die out as well as how they evolve or adapt to changing climatic and environmental situations. |
| 5. | Cell and Molecular Biology  Genetics | Cell structure and functions. Molecular studies, Genome studies | Basic study of Cell structure and functions. It includes, evolution of structure of genome, genetic basis of adaptation and specification and genetic changes in response to selection within the population |
| 6. | Genetics | History, Definition, Concept, branches and applications of Genetics. | Basic study of Cell structure and functions. It includes, evolution of structure of genome, genetic basis of adaptation and specification and genetic changes in response to selection within the population |
| 7. | Medicinal Botany | Ayurveda and plants used as medicines | Medicinal plant includes various types of plants used in treating various ailments naturally. |
| 8. | Plant Diversity and Human Health - | Plant diversity and its scope- Genetic diversity, Species diversity, Plant diversity at the ecosystem level, | cology involves use of scientific methodology via lab experiments to understands how the different organisms grow, populate, how they interact with other organisms either as parasites, predators, how the organisms die out as well as how they evolve or adapt to changing climatic and environmental situations. |
| 9 | Plant Physiology and Metabolism | Metabolic activities of plants | Fundamental processes such as [photosynthesis](https://en.wikipedia.org/wiki/Photosynthesis), [respiration](https://en.wikipedia.org/wiki/Cellular_respiration), [plant nutrition](https://en.wikipedia.org/wiki/Plant_nutrition), plant hormone functions, [tropisms](https://en.wikipedia.org/wiki/Tropism), [nastic movements](https://en.wikipedia.org/wiki/Nastic_movements), [photoperiodism](https://en.wikipedia.org/wiki/Photoperiodism), [photomorphogenesis](https://en.wikipedia.org/wiki/Photomorphogenesis), [circadian rhythms](https://en.wikipedia.org/wiki/Circadian_rhythms), environmental stress physiology, seed [germination](https://en.wikipedia.org/wiki/Germination), dormancy and stomata function and transpiration, both parts of plant water relations, are studied by plant physiologists |
| 10. | Biochemistry | biochemical mechanisms of the plant in synthesizing various components | Plant biochemistry is an important emerging ﬁeld in the agricultural sciences. Basic knowledge of the chemistry and the biochemical mechanisms of the plant in synthesizing various components are essential for advancements needed in other areas of agriculture like plant breeding, plant protection, plant production, etc |
| 11. | Plant Pathology | Study of plant disease, causes and control | The study of the organisms and environmental conditions that cause disease in plants, the mechanisms by which this occurs, the interactions between these causal agents and the plant (effects on plant growth, yield and quality), and the methods of managing or controlling plant disease |
| 12. | Evolution and Population genetics | Distinction between Origin of life and Organic Evolution, Historical account of Origin of life, Origin of Earth Vs Origin of life: Gaia Hypothesis, Earliest Fossils, | Fossilization, Conditions of fossilization, Dating of fossils: Uranium Lead method, Radio-carbon method, U-series and ESR method, Geological Time scale: Eras, Periods, epochs, and duration in millions of years and plant life |
| 13. | Advanced Plant Biotechnology | Study of plant Tissue culture Bio-techniques | The studies of different plant tissue culture methods will help students to set up own business in future and study of different gene transformation in plant. |
| 14. | Plant Breeding and Seed Technology | Crop and seed quality improvement | The science driven creative process of developing new plant varieties that goes by various names including cultivar development, crop improvement, and seed improvement. |
| 15. | Nursery and Gardening Managemen | Nursery, planning and seasonal activities - Planting - direct seeding and transplants. | Gardening: definition, objectives and scope - different types of gardening - landscape and home gardening - parks and its components - plant materials and design -computer applications in landscaping - Gardening operations: soil laying, manuring, watering, management of pests and diseases and harvesting. |
| 16. | Biofertilizers | General account of the microbes used as Biofertilizers | Introduction, Scope and importance of Biofertilizers |

Class: SYBASubject: English Special-I

Course name: Appreciating Drama

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | A Midsummer Night’s Dream- William Shakespeare | Drama | Gender issues/Love Marriages / Social context |
|  | Arms & the Man | Drama | Effects of War on humanity, racial issues, Human values |
|  | The Fire and the Rain | Drama | Gender inequalities, Castism, Human values, Indian Mythical study |

Class: SYBASubject: English Special-II

Course name: Appreciating Poetry

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Appreciating poetry- Mirage | poems | Gender differences/ ecological values/ aesthetic values/ humanitarian values |
|  |  |  |  |

Class: SYBASubject: English General-II

Course name: Skill Enhancement Course

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Advanced Study of English language- Linguistics | Language Study | Phonetics, Morphology, Semantics, Syntax, etc. |

Class: SYBA Subject: Compulsory English

Course name: Compulsory English

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Panorama: Values and Skills through Literature | Short Stories, Poetry, Grammar, Vocabulary & Soft Skills | Racial Issues/Indian Ethos/Gender differences/ cultural values/ aesthetic values/ humanitarian values/language aspects/soft skills |

Class: SYBSc and SYBCS Subject: Technical English

Course name: Technical English

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Short Stories & poems: Horizon | Short Stories/  Poetry/grammar/ soft skills | Indian Ethos/ cultural values/ aesthetic values/ humanitarian values/language aspects/soft skills |

Class: TYBA Subject: English Special III

Course name:Appreciating Novel

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Silas Marner | Novel | Society & man/cultural values/ aesthetic values/ humanitarian values/  Feministic study/Natural World |
|  | A Farewell to Arms | Novel | Effects of war/cultural values/ aesthetic values/ humanitarian values |
|  | The Painter of Signs | Novel | cultural values/ aesthetic values/ humanitarian values |

Class: TYBA Subject: English Special IV

Course name:Introduction to Literary Criticism

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Literary Criticism | Critical Approaches/Literary & Critical Theories | Critical Analysis of literature, Appreciation skills/Broad understanding of literary terms |

Class: TYBA Subject: English General III

Course name: Skill Enhancement Course: Enhancing Employability Skills

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Aspirations: English for Careers | Careers/ Employability skills | Employability Skills/Competitive Exam skills/ Research skills/ Content writing |

Class: TYBA Subject: Compulsory English

Course name: Compulsory English

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  |  |  |  |
|  | Exploring New Horizons | Prose/Poetry/Grammar/  Writing/ Soft Skills | Aesthetic values/Cultural values/ writing skills/ soft skills/language aspects |

Class: F.Y.B.Sc Subject: Zoology

Course name: ZO-111 Animal Diversity I

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | General Features of kingdom Animalia | General characters, Grades of organization,  Symmetry. | 1. Sensitisation towards animal world. 2. Development of conceptual clarity with regard to the anatomy of animals at different levels. 3. Understanding of evolutionary perspective of each level of organisation 4. Learning of modern system of animal classification |
|  | Kingdom Protista  (Phylum: Protozoa) | Salient features,  Classification up to classes,  Locomotion,  Economic importance | Get an idea of following   1. Ecological role of unicellular eukaryotes 2. Evolution and mechanism of heterotrophy. 3. Pathogenicity and industrially important protozoan species. |
|  | Origin of Metazoa | Origin and importance | Understanding of origin of intercellular communication. |
|  | Phylum: Porifera | Introduction  Classification,  Canal system in sponges,  Skeleton in sponges,  Regeneration in sponges,  Economic importance | Understanding of following   1. Physiology of metazoan in the absence of true tissue. 2. Role of Porifera in food web with reference to Filter feeding habit |
|  | Phylum: Cnidaria | Salient features,  Classification up to class level, Polymorphism in Hydrozoa,  Economic importance | Understating of key evolution aspects like formation of the third germ layer, nervous system and bilateral symmetry |
|  | Phylum: Platyhelminthes | Salient features,  Classification up to classes,  Parasitic adaptations,  Economic importance | To learn classification and adaptations in life endangering parasite. |

Course name: ZO-121 Animal Diversity II

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Phylum Aschelminthes | Salient feature,  Classification,  Economic importance | Understanding ofclassificationand threats from the free living parasite for human, pets and economically important plants |
|  | Phylum Annelida | Salient features,  Classification  Economic importance | Understanding of classification and ecological role of Annelids. |
|  | Phylum Arthropoda | Salient features,  Classification  mouth parts in insects  Economic importance | Understanding of arthropods with respect to following   1. Classification, modifications (with respect to food habit) and importance (as source of food, silk, honey and wax) of arthropods 2. Role in drug discovery, pollination and biological pest control. 3. Ecological indicators |
|  | Phylum Mollusca | Salient features,  Classification,  Economic importance of Mollusca. | Understanding of molluscs with respect to following   1. Classification and importance as source of food, calcium carbonate and drug. 2. Role as ecological indicator. 3. Ornamental value of shell. |
|  | Phylum Echinodermata | Salient features, Classification | Understanding of echinoderms with respect to following   1. Origin of deuterostome. 2. Classification and role as ecological indicator. 3. Value for ornamental fishery. |

Course name: ZO-112 Animal Ecology

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Introduction to Ecology | Basic concepts | Understanding of prosperity and present degradation of environment |
|  | Ecosystem | Types,  Structure and Composition,  Food chain,  Concept of Eutrophication | Understanding of ecosystem with respect to following   1. How human is part of ecosystem. 2. Need of maintaining of ecological balance. 3. Sustainable utilization and conservation of natural resources |
|  | Population | Characteristics,  Regulations,  Interactions,  Methods of population estimation. | 1. Learning of importance and techniques of quantitative and qualitative estimation of each species. 2. Understand population trends. |
|  | Animal interactions | Introduction,  Types,  Antagonistic associations | Understanding of dependence and association between species |

Course name: ZO-122 Cell Biology

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Introduction | Importance of Cell Biology | Industrial applications of Cell Biology |
|  | Overview of Cells | Prokaryotic and Eukaryotic cells | Structural and functional organization of cell with an emphasis on nucleus, plasma membrane and cytoskeleton. |
|  | Techniques in Cell Biology | Microscopy, Stains and dyes, Micrometry. | Learn techniques to understand dynamism of each part of animal |
|  | Plasma Membrane | Structure, Transport across membranes, Functions of cell membrane, Cell Junctions | 1. Dynamism of cell membrane. 2. Acquire insight of transport mechanisms for the maintenance and composition of cell |
|  | Nucleus | Structure and function,  Chromatin | 1. Understand ultrastructure of nucleus 2. Involvement of nucleus in heredity and variation |
|  | Endomembrane System | Structure, location and Functions | 1. Understand the compartmentalization and higher degree of cell specialization 2. Understand the interlinking of endomembrane system for functioning of cell. |
|  | Mitochondria and Peroxisomes | Ultrastructure and function | 1. Understand ultrastructure of mitochondria and peroxisomes 2. Role of mitochondria and peroxisomes in metabolism |
|  | Cell Division | Cell cycle, Mitosis, Meiosis. | Understand mechanism of Reproduction of cell |

Class: S.Y.B.Sc Subject: Zoology

Course name: ZY-231: Animal Systematics and Diversity -III

| 1 | Introduction to Phylum Chordata | Origin & Ancestry of Chordates, Comparative account of fundamental characters of Chordates with Non Chordates, Salient features of Phylum Chordata, Classification of Phylum Chordata up to classes – Pisces, Amphibia, Reptilia, Aves, Mammalia. | To understand theevolutionary tree chordate and The students will be able to understand, classify and identify the diversity of higher vertebrates. |
| --- | --- | --- | --- |
| 2 | Introduction to Group – Protochordata. | Salient features of Protochordata, Salient features of subphylums with two example | The students will able to understand the complexity of Group Protochordata |
| 3 | Introduction to subphylum – Vertebrata | Salient features of Vertebrata, Introduction and General characters of sections with two examples - Names only | The students will able to understand the complexity of Group Vertebrata |
| 4 | Introduction to Class – Pisces | Salient features of Class – Pisces, Introduction and Salient features of sections with two examples - Names only | The students will able to understand the diversity of fishes and understand the different parts of the fishes |
| 5 | Introduction to Class – Amphibia | Salient features and Parental care in Class – Amphibia | The students will able to understand the complexity of class Amphibia |
| 6 | Study of Scoliodon | Systematic position, Habit and habitat, External characters, Digestive system, food, feeding and physiology of digestion, Respiratory system, Blood vascular system, Nervous system and sense organs, Male urinogenital system and female reproductive system | Understanding of vertebrate animal life and its classification |

Course name: ZY-232: Applied Zoology – I

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Sericulture : | An introduction to sericulture, Study of different types of silk moths, their distribution and varieties of silk produced , External morphology and life cycle of Bombyx mori, Cultivation of mulberry, Harvesting of mulberry, Silk worm rearing, Post harvest processing of cocoons | 1. Understand scope and importance of sericulture in livelihood development. 2. Understanding of key aspects of silk worm life cycle 3. Selection of appropriate methods for sericulture |
|  | Agricultural Pests and their control : | An introduction to Pest, types of pests  Major insect pests of agricultural importance,  Non insect pest  Pest control practices,  Plant protection appliances,  Hazards of pesticides on human and antidotes. | Understand methods to reduce fisheries loss |

Class: S.Y.B.Sc Subject: Zoology

Course name: ZY-241: Animal Systematics and Diversity – IV

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Introduction to class –Reptilia | Salient features of class Reptilia with one example (name only) – *Chelone*, *Calotes*.  Venomous and Non-venomous snakes – Cobra, Russell’s viper, Rat snake, Grass snake.  Snake venom, symptoms, effect and cure of snake bite, first aid treatment of snakebite.  Desert adaptations in reptiles in brief. | 1. The students will able to understand the complexity of class Reptilia 2. The students will be aware of different types of snakes and their characters and first aid treatments |
|  | Introduction to class –Aves | Salient features of class Aves with two examples (names only) – Sparrow, Parrot.  Flight adaptations in birds.  Types of Beaks and feet in birds.  Migration in birds – Altitudinal, Latitudinal. | The students will be able to understand the varieties of birds and their peculiarities |
|  | Introduction to class - Mammalia | Salient features of class Mammalia with two examples (names only) – Rat, Rabbit.  Egg laying mammals.  Aquatic adaptations in mammals.  Flying adaptations in mammals.  Cursorial and fossorial adaptation in mammals | The students will be able to understand the diversities and various adaptations of mammals |
|  | Study of Rat | Systematic position, habit and habitat.  External characters.  Digestive system, food and feeding.  Respiratory system.  Blood vascular system – Structure of Heart.  Nervous system – Central Nervous system only.  Sense organs – Structure and functions of Eye & Ear.  Reproductive system. | The students will be able to understand different systems of mammals with the study of rat model |

Course name: ZY-242: APPLIED ZOOLOGY – II

| **No.** | **Chapter** | **Topic** | **Enrichment** |
| --- | --- | --- | --- |
|  | Apiculture : | Introduction to Apiculture, Study of habit, habitat and nesting behavior,  Life cycle, Colony organization and division of labour, Polymorphism,  Bee behaviour and bee communication,  Bee keeping equipments,  Bee keeping and seasonal management,  Bee products,  Diseases and enemies of Bees,  Bee pollination | 1. Understand scope and importance of apiculture in livelihood development. 2. Understanding of bee colony characteristics and key aspects of honey bee life cycle 3. Selection of appropriate methods for apiculture |
|  | Fisheries : | An introduction and types,  Types of ponds used in fishery,  Habit, habitat and culture methods of freshwater forms,  Harvesting methods  Crafts and gears in Indian Fishery,  Fishery byproducts,  Fish preservation technique | 1. Understand basic requirements and techniques in fisheries and aquaculture 2. Understand role of fisheries in livelihood development 3. Understand design and operation of different type of crafts and gears |

T.Y.B.Sc

| Sr. No. | Coue Title | Topics | Enrichment |
| --- | --- | --- | --- |
| 1. | Pest Management | Different types of pests, their control methods and Integrated pest management | a) To distinguish positive and negative impacts of pesticide use.  b) To understand problems resulting from misuse, overuse, and abuse of chemical pesticides.  c) To undrstand pesticide resistance and how it develops.  d) To Identify ecological and biological characteristics important in development of pest populations.  e) To Identify 10 tactics commonly used in IPM and be able to distinguish them.  f) To Understand society’s role in IPM decisions.  g) To describe different groups of pests and compare them to weeds and plant pathogens.  h) To analyse and compare management tactics to determine the best approach to reducing pest populations, weeds, and disease presence.  i) To locate appropriate, scientifically valid sources of information on specific tactics to manage insect pests, weeds, and diseases.  j) To know and how to develop an IPM program.  . |
| 2. | Histology | Histology of different types of organs and glands | a) The students will be able to understand, classify and identify the different types of tissue.  b) The students will understand the complexity of various tissues in an organ.  c) The students will be able to learn structure & functions of various tissues.  d) The students will understand the various diseases related to organs.  e) The student will be able to know the role of glands in mammals. |
| 3. | Biological Chemistry | Macro and micro molecules and their significance | a) Learners will be able to understand basic concepts and significance of biochemistry  b) The students will learn about the pH and Buffers.  c) The students will learn about the chemical structures of carbohydrate, and their biological and clinical significance.  d) The students will be able to understand, interpret structure and importance of proteins, carbohydrates and lipids  e) Learners will be able to comprehend variations in enzyme activity and kinetics. |
| 4. | Genetics | Study of Mendelian genetics, chromosomal aberrations, Human genetics and application of genetics | a) To understand about genes and genetic disorders  b) To understand the application of genetics |
| 5. | Developmental Biology | Developmental stages of embryo, chick embryology | a) To know about the developmental stages of embryo  b) To understand the process of oogenesis and spermatogenesis |
| 6. | Parasitology | Life cycle of some exo and endo parasites and associated diseases | a) The students will be able to learn about basics and scope of parasitology.  b) The students will be able to learn the types of host and parasite with examples.  c) The students will be able to learn about the morphology, life cycle, pathogenicity and treatment of common parasites (Protists and Platyhelminthes).  d) The students will be able to learn about host -parasite relationships and their effects on host body.  e) The students will be able to learn about the arthropod parasites and their role as vector. |
| 7. | Aquarium Management | Development and Maintenance of aquarium, aquarium fishes | a) To learn to develop an aquarium and rearing of ornamental fishes  b) To understand the process of fish breeding |
| 8. | Poultry Management | Breeding, housing, feeding, health management.  Poultry products | a) The students will be able to understand the Poultry farming practices.  b) The students will able to understand the poultry breeding techniques.  c) The students will be able to understand poultry rearing techniques.  d) The students will be able to understand feeding requirement and food ingredients.  e) The students will be able to understand the poultry disease and their pathogens.  f) The students will be able to understand market value of poultry products. |
| 9 | Medical & Forensic Zoology | Forensic zoology, forensic medicines and forensic analysis | a) The students will be able to understand the basics principles of Medical and Forensic Zoology.  b) The students will able to understand scientific methods in crime detection.  c) The students will be able to understand the advancements in the field of Medical and Forensic Zoology.  d) The students will be able to understand modern tools, techniques and skills in forensic investigations.  e) The students will be able to describe the fundamental principles and functions of forensic |
| 10. | Animal Physiology | Physiology of Digestive system, circulatory system, excretory system, Reproductive system, respiratory system and glands | a) The various physiological organ-systems and their importance to the integrative functions of the human body.  b) Understand Concept of energy requirements  c) Various aspects of Digestive physiology.  d) Circulatory system with medical conditions  e) Understand Respiratory mechanism and gases transport.  f) Eliminations of waste materials from the body.  g) Develop understanding in Structure and functions of muscles  h) Understand formation of gametes and function of endocrine glands. |
| 11. | Molecular Biology | Center dogma of molecular biology, DNA repair mechanism, Recombinant DNA technology, LAC oparon | a) Learner shall get an insight into molecular mechanisms of various biological processes in cells and organisms  b) Learner shall get an insight into the Structure of DNA and RNA, DNA and RNA as genetic material  c) The course shall prepare learner to get insight into the Central Dogma of Molecular Biology  d) Learner shall also understand the concept of gene regulation  e) Learner shall get an insight into the DNA Damage and Repair |
| 12. | Entomology | Insect anatomy, Morphology, ecology, social group and economic importance | a) Understand basic concepts in Entomology and its scope.  b) Learn morphology and anatomy of Insects.  c) Understand the concept of social organization in Insects.  d) Understand the development process of Insects.  e) Identify disease causing insect vectors.  f) Will be able to design and implement pest controlling methods against pests. |
| 13. | Techniques in Biology | Microscopy,  Microtomy: Tissue fixation and Processing,  Haematological Techniques,  Immunological Techniques, Instruments in field bilogy and laboratory techniques | a) To understand the process of tissue fixation for observe structure of any organ  b) To understand different laboratory techniques  c) To understand the process of hematological profile and immunological techniques |
| 14. | Evolutionary Biology | Evidences of evolution, Isolation, Speciation, Human evolution, Fossil study | a) Students will be able to learn most of the essential aspects of Evolutionary Biology in detail which will help them in acquiring better understanding regarding the subject.  b) Explain important processes, principles and concepts and critically evaluate theories and empirical research within evolutionary biology  c) Apply evolutionary theory and concepts to address empirical and theoretical questions in evolutionary biology. |
| 15. | Environmental Impact Assessment | Overview of Environmental Protection acts,    Environmental Impact Assessment (EIA),    Stakeholders in EIA process, Overview of Scheme for Accreditation of EIA Consultant Organizations (NABET / QCI) | a) To Understand the sustainable, use of natural resources  b) To understand the laws for environmental protection  c) To understand the Environmental impact assessment and its application |
| 16. | Project | Students have to complete the research project in the stipulated time and present the dissertation at the time of the examination in a proper format. Students should be encouraged to take up laboratory work, hands-on practical investigation and design experimental setup. Field work to be carried out under proper supervision and permissions from the concerned authorities. | a) Students can learn the research activities  b) To learn prepare research paper  c) Students will be aware od plagiarism |

Environmental science syllabus

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