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EAMCET Syllabus for Medicine

Subject :Botany

- INTRODUCTION
 - Origin, development and scope of Botany
 - Classification of plant kingdom
 - Branches of Botany: Morphology, Cytology, Embryology, Palynology, Taxonomy, Physiology, Ecology, Palaeobotany, Genetics, Phytogeography, Phycology, Mycology, Lichenology, Bryology, Pteridology, Microbiology, Bacteriology, Virology
 - Parts of angiospermic plant
- EXTERNAL MORPHOLOGY
 - Vegetative morphology:
 - Root: Root system; Types, Functions, Modification of roots (Velamen roots, Photosynthetic roots, Respiratory roots, Parasitic roots, Storage roots and nodular roots).
 - Stem: characteristics and functions of the stem; Modifications of stem: Aerial: Tendril, Thorn, Hook, Phylloclade, Tuberos stem and Bulbil; Sub-aerial: Runner, Stolon, Sucker & Offset, Underground: Rhizome, Corm, Stem tuber & Bulb
 - Leaf: Parts of Leaf, Types and Functions of leaves, Venation, Phyllotaxy, Leaf modifications: - tendrils, spines, scale leaves, phyllode, reproductive & trap leaves.
 - Reproductive morphology:
 - Inflorescence: Introduction, Types of Inflorescence - Racemose, Cymose and Special Types
 - Flower: Parts of a typical flower: Structure, Sex distribution and symmetry of flower, position of gynoecium. Detailed description of flower: Perianth, Calyx, Corolla, aestivation, Androecium Parts, fixation and dehiscence of anther, length of stamens, union of stamens, Gynoecium – number of carpels, fusion of carpels, ovary – number of locules, placentation, types of styles, stigma.
- REPRODUCTION IN ANGIOSPERMS
 - Introduction – Sporophytic and Gametophytic stages
 - Structure of Anther; Microsporogenesis, Structure of a pollen grain and development of male gametophyte
 - Ovule – Structure and Types; megasporogenesis - development and structure of embryo sac
 - Pollination: Types of pollination, self and cross-pollination, contrivances for cross pollination and self pollination, agents of cross pollination.
 - Fertilization – Process, Post - fertilization changes; Seed structure (Dicot & Monocot) and seed germination (epigeal, hypogeal & vivipary)
 - Fruits: Classification; False fruits and true fruits - Simple fruits (fleshy fruits – berry, pome, pepo, hesperidium, drupe; Dry fruits – dehiscent- legume, septicidal capsule, septicidal capsule, loculicidal capsule; Indehiscent fruits – caryopsis, cypsela, nut; schizocarpic – lomentum, schizocarp); Aggregate and Multiple fruits
- PLANT TAXONOMY
 - Introduction – Alpha and Omega taxonomy; Aspects of taxonomy – Identification – Flora, herbaria, botanical gardens (RBG – Kew, IBG – Kolkata, NBG – Lucknow); Nomenclature, Classification – Types, Units and a brief account of Bentham & Hooker's system. Study of the

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following families:

- Malvaceae
- Fabaceae
- Solanaceae
- Liliaceae
- CELL BIOLOGY
 - Introduction, Techniques of Cell Biology – microscopy (light, electron, fluorescent, phase contrast, SEM, TEM – only uses), Separation techniques (centrifugation, electrophoresis)
 - Ultrastructure of plant cell (Eukaryotic cell - Structure of cell wall and cell membrane, Protoplasm, cytoplasm, Plastids, mitochondria, endoplasmic reticulum, ribosomes, golgi complex, lysosomes, peroxisomes, glyoxysomes, vacuoles and Nucleus).
 - Chromosomes - Introduction, structure (light microscopic study), classification, functions and nucleosome model
 - Nucleic acids
 - Cell Division : Cell Cycle, Mitosis and Meiosis
- INTERNAL ORGANIZATION OF PLANTS
 - Tissues – Types (Meristematic and Permanent) structure and functions.
 - Internal structure of Dicot root (Primary) and Monocot root.
 - Internal structure of Dicot stem (Primary) and Monocot stem.
 - Internal structure of leaf (Dicot and Monocot)
 - Secondary growth in dicot stem.
- PLANT ECOLOGY
 - Introduction
 - Plant communities – Hydrophytes, Mesophytes and Xerophytes; Ecological adaptations (Morphological & Anatomical) of Hydrophytes and Xerophytes.
- GENETICS
 - Introduction
 - Mendel's Principles – Monohybrid and Dihybrid cross, Back cross and Test cross, Concept of probability in relation to Genetics.
 - Linkage and crossing over.
 - Mutations.
- PLANT KINGDOM
 - Introduction
 - Spirogyra – distribution and habitat, thallus structure, cell structure, reproduction– vegetative, asexual, sexual, life cycle
 - Rhizopus – distribution and habitat, structure of mycelium and hypha, reproduction – vegetative, asexual, sexual, life cycle, sexuality in Rhizopus.
 - Funaria: distribution and habitat, external morphology of the gametophore, anatomy of the stem, reproduction vegetative and sexual, sporophyte, protonema, life cycle.
 - Pteris: distribution and habitat, Morphology of the sporophyte, anatomy of the Rhizome, vegetative, asexual and sexual reproduction, Embryo, life cycle.
 - Cycas: distribution and habitat, Morphology of the sporophyte, anatomy of the coralloid root and leaflet, Reproduction, Embryo, Seed, life cycle.

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- MICROBIOLOGY:
 - Introduction and importance of microbiology.
 - Bacteria – Discovery, Distribution, sizes, shapes, Gram staining (in brief), structure of cell, nutrition, reproduction – asexual (binary fission), sexual – Conjugation (F+ and F- only), transformation and transduction
(only definition, discoverer and example for transformation and transduction), economic importance – beneficial (Agriculture, Industry, Medicine, Biotechnology), harmful (spoilage of food, plants, human and animal diseases).
 - Viruses – historical account, types, structure (TMV and T4 details), general account of sizes, shapes, replication (Lytic and Lysogenic cycles). Plant diseases caused by viruses, transmission of viruses and control of viral diseases.
- PLANT PHYSIOLOGY
 - Introduction A. WATER RELATIONS OF PLANTS:
 - Absorption of water – Introduction, soil water, water potential, Diffusion, Imbibition, Osmosis, Plasmolysis, Mechanism of absorption of water.
 - Ascent of Sap: Definition, Cohesion – Tension theory
 - Transpiration : Definition, SPAC and types of transpiration, mechanism of stomatal movement, factors, significance, Antitranspirants.
 - B. NUTRITION IN PLANTS
 - Introduction, types of nutrition (symbiosis, parasitism, chemotrophism, autotrophism)
 - Mineral nutrition – Introduction, soil as source, criteria of essentiality, importance of macro and micro elements, ion absorption – passive and active (carrier concept), Biofertilizers
 - C. METABOLISM
 - Enzymes – introduction, properties, IUB classification, mechanism of enzyme action (lock & key theory), enzyme inhibition
 - Photosynthesis - Definition, pigments, structural organization of chloroplast, Mechanism of Photosynthesis
 - Light reactions - Hill reaction, Emerson's Enhancement Effect, PSI and PSII, electron transport and proton translocation, photophosphorylation, Carbon assimilation - C3, C4 pathways, Factors, Photorespiration, Blackman's law. Respiration – definition, Types, Mechanism of 2 aerobic and anaerobic respiration, Alcoholic fermentation, Respiratory quotient (R.Q).
 - Nitrogen metabolism: Nitrogen cycle, Biological nitrogen fixation (Symbiotic, Non-symbiotic); Genetic code, Biosynthesis of Proteins.
 - Plant growth & its regulators: Growth curve; introduction to growth regulators, physiological effects and applications-Auxins, Gibberellins, Cytokinins, Abscisic acid and Ethylene; Photoperiodism and Vernalization.
- PLANTS AND HUMAN WELFARE
 - Crop improvement – Introduction, aims and objectives of plant breeding; methods – definition, methodology, advantages and achievements of Introduction, Selection (Mass, Pureline, Clonal), Hybridization, Heterosis, Mutation breeding and Polyploidy breeding. Biotechnology
 - Introduction, Definition, Scope and applications of Biotechnology
 - Genetic Engineering - Recombinant DNA Technology, Genetically Modified Crops, Transgenic plants, Biosafety issues, applications of Genetic Engineering
 - Tissue Culture
 - Techniques and Applications.

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- Single cell protein
- Mushroom Cultivation: Morphology and types of mushrooms, Food value, cultivation of white button mushrooms.

Subject : Zoology

- Basics
 - Nature and scope of Zoology
 - Zoology, the meaning
 - Areas of study under zoology
 - Relationship between zoology and other sciences, basic principles of classification, need for classification, nomenclature, levels of classification or systematic hierarchy, species concept, outline classification of the kingdom animalia.
- General characters and classifications Invertebrate Phyla (upto the level of classes)
 - Protozoa : general characters and brief account of classification
 - Porifera : general characters & classification
 - Cnidaria : general characters and classification
 - Platyhelminthes : general characters and classification
 - Nematoda : general characters and classification
 - Annelida : general characters and classification
 - Arthropoda : general characters and classification, Mollusca – general characters and classification
 - Echinodermata : general characters and classification
- Animal Organization
 - Introduction, Multicellularity Diploblastic, triploblastic organization
 - Symmetry : Types and characteristic features of each symmetry with examples i.e. Asymmetry, Radial Symmetry, Biradial symmetry Bilateral symmetry, Definition of Coelome, definitions and examples of acoelomates, pseudocoelomates and eucoelomates. The structure of a generalized animal cell (brief account only), Animal Tissues (brief account) epithelial tissues, connective tissue proper, supporting tissue, fluid tissue, muscular tissue and nervous tissue.
- Locomotion and Reproduction in Protozoa
 - Locomotion : Introduction, locomotory organelles in Protozoans (pseudopodia, cilia, flagella) giving examples
 - Locomotion in Protozoans : Amoeboid movement, Sol-gel theory, Ciliary and Flagellar movements synchronal and metachronal movements in Paramecium, Effective & Recovery strokes
 - Reproduction in Protozoa, Types of Reproduction (i) Asexual reproduction types : Transverse binary fission in paramecium, longitudinal binary fission in Euglena (ii) Sexual reproduction in Protozoa Conjugation in Vorticella and its significance.
- Animal Associations: Definition and examples of Mutualism, Symbiosis, Commensalism, Parasitism, Structure, life cycles, diseases and preventive measures of the following parasites :
 - Entamoeba histolytica (structure, life cycle pathogenecity, prevention),
 - Plasmodium vivax (structure, life cycle pathogenecity, prevention),
 - Taenia solium (External characters body wall, organs in mature proglottid, fertilization Lifecycle-Pathogenecity and prevention)
 - Wuchereria bancrofti (structure, life cycle, pathogenecity, prevention)

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- Phylum Annelida
Pheritima posthuma
 - Introduction, importance, different genera, species, habit & habitat
 - External characters : structure and arrangement of setae
 - body wall, coelom, wall of alimentary canal and locomotion, Pheretima
 - Digestive system, Respiratory system, Pheritima
 - Blood vascular system
 - Excretory system
 - Nervous system and receptor organs
 - Reproductive system
 - Copulation cocoon formation & development, Regeneration, economic importance.
- Phylum
 - Arthropoda – Introduction – Evolutionary characters of Arthropoda,
 - Cockroach, Periplaneta americana – external features, body wall, Endoskeleton, stink glands, coelom, fat bodies, locomotion, Cockroach : Digestive system, Respiratory system, Nervous system, sense organs, structure of ommatidium,
 - Mouth parts of insects, cockroach, Mosquito, Housefly, Butterfly
 - Economic importance of insects (i) useful insects (ii) harmful insects
- Man & Biosphere
 - Elementary aspects of ecosystem, Abiotic factors - light, temperature, water and their biological effects on organisms, Biotic factors: producers, consumers and decomposers,
 - Functional aspects of ecosystem, food chains, food web, ecological pyramids, Lake as an example of fresh water ecosystem, population ecology – Population density, growth and growth curves,
 - Biodiversity, conservation of biodiversity and wild life conservation.
- Phylum – Chordata
 - Characteristics of Chordata, Ancestry of Chordates, Outline classification of Chordata, Theories of origin of Chordata,
 - General features of Sub-phylum Urochordata & Sub-phylum Cephalochordata,
 - Sub-phylum Vertebrata : Pisces - General Characters, Classification with examples, Amphibia : General characters, Classification with examples
- Reptilia
 - Reptilia: General Characters, Classification - Chelonina, Rhynchocephalia, Squamata and Crocodilia with typical examples, Identification of poisonous and non poisonous snakes, poison apparatus, toxicity of snake venom and treatment of snake bite including first aid.
 - Aves: Distinctive features, Classification, differences between Ratitae and carinatae with typical examples.
 - Mammalia : Distinctive features of Prototheria, Metatheria & Eutheria with examples
- Rabbit – Functional Anatomy-I (Digestive System, Respiratory System & Circulatory System)
 - Classification and External characters of Rabbit,
 - Digestive System, Alimentary Canal, Digestive Glands, Nutrition & Digestion, Process of Digestion, Role of Vitamins and Mineral in Nutrition, Nutritional requirements in relation to balanced diet (as subtopic),
 - Respiratory system, Mechanism of breathing and transport of gases.
 - Circulatory System, Structure of heart, Function of heart, Arterial system, Venous System, Blood Clotting

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- Rabbit - Functional Anatomy-II (Musculo-Skeletal System, Excretory System, Reproductive System)
 - Musculo Skeletal System, Ultra Structure of Muscle fibre, sliding filament theory, Elementary idea of Axial skeleton and appendicular skeleton: Types of joints of Rabbit.
 - Excretory System, Excretory Organs, Structure of nephron in mammals, Formation and Composition of Urine, Micturition.
 - Reproductive system: Male Reproductive system, Female Reproductive system, Copulation, Fertilization and Development, Placenta. Gestation period.
- Genetics-Introduction
 - Multiple alleles and Blood groups, ABO Blood groups, Rh antigens, Sex determination, Sex Chromosomes, Heterogametic sex determination, Sex determination in Drosophila, Sex determination and Sexual differentiation in human being, Haplodiploidy in honey bee, Effects of environment on sex determination, Hormonal control of sex determination, Sex linked inheritance, Sex linkage in drosophila, Genes on the sex chromosomes, Sex linked characters in human beings, X-linked characters, Y-linked characters, X-Y linked characters, Sex limited characters, Sex influenced characters.
 - Gene Expression and regulation, Genetic Materials, Function of Genes, Gene regulation in prokaryotes, Gene expression in eukaryotes, concepts of Gene action one gene one poly peptide concept only.
 - Basic concepts of animal breeding, System of breeding, Heterosis, Progeny Test, Cloning, Transgenic animals. Genome and Human genome project, Gene Mapping, D.N.A. finger printing, An elementary idea of gene therapy
- Organic Evolution
 - Evolutionary concepts and origin of life. Experimental verification of chemical origin of life.
 - Theories of Evolution : Lamarckism or Inheritance of acquired characters, Natural Selection (Darwinism), Sexual selection, Artificial selection,
 - Mutation theory of evolution, Synthetic theory of evolution or Neo-Darwinism.
 - Hardy-Weinberg equilibrium and evolutionary process – Natural selection, Genetic load, Genetic Drift, Changes in Genotype frequencies and Speciation
- Applied Biology
 - Aquaculture: List of animals of aquaculture importance, Fisheries – fish culture and rearing methods.
 - Poultry : Introduction to Poultry, Poultry farming, Poultry diseases.
 - Biotechnology : Recombinant DNA technology, Industrial use of micro organisms and DNA Technology, Vaccines, Enzymes, hormones, Interferons, Monoclonal anti bodies.
 - Cell cycle and its regulation, cancer biology, stem cells.
 - Bio medical technology : X-ray radiography, Definitions of Magnetic Resonance Imaging (MRI), Electro Cardiography (ECG), Electro Encephalography (EEG), Transplantation, ELISA (Enzyme linked immunosorbent assay).

Subject : Physics

- Work, Energy and Power
- Waves
- Thermal and Chemical Effects of Currents
- Solids and Semiconductor Devices

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- Rotational Motion
- Ray Optics and Optical Instruments
- Oscillations
- Magnetism
- Magnetic Effect of Currents
- Laws of Motion
- Introduction and Measurement
- Heat and Thermodynamics
- Gravitation
- Electrostatics
- Electrons and Photons
- Electromagnetic Waves (Qualitative Treatment)
- Electromagnetic Induction and Alternating Currents
- Description of Motion in Two and Three Dimensions
- Description of Motion in One Dimension
- Current Electricity
- Atoms, Molecules and Nuclei

Subject : Chemistry

- The d-and f-Block elements
- Surface chemistry
- States of matter
- Some basic principles of Organic Chemistry
- Some basic concepts in Chemistry
- Solutions
- Solid state Chemistry
- s-Block Elements (Alkali and Alkaline Earth metals)
- Redox reactions
- Purification and characterization of carbon compounds
- Polymers
- p-Block Elements
- Organic compounds with functional groups containing oxygen
- Organic compounds with functional groups containing halogens (X)
- Organic Compounds with functional group containing nitrogen
- Hydrogen
- Hydrocarbons
- General principles and processes of isolation of elements
- Equilibrium
- Environmental Chemistry
- Electrochemistry
- Coordination Compounds
- Classification of elements and periodicity in properties
- Chemistry in everyday life
- Chemical Thermodynamics
- Chemical Kinetics
- Chemical Energetics

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- Chemical bonding
- Biomolecules
- Atomic structure

