SEMESTER - II

MAMMALIAN PHYSIOLOGY (Code: BBC-201)

UNIT I: Digestion and Respiration (15 Periods)

Digestion: Mechanism of digestion & absorption of carbohydrates, Proteins, Lipids and nucleic acids. Composition of bile, Saliva, Pancreatic, gastric and intestinal juice
Respiration: Exchange of gases, Transport of O2 and CO2, Oxygen dissociation curve, Chloride shift.

UNIT II: Circulation (15 Periods)

Composition of blood, Plasma proteins & their role, blood cells, Haemopoisis, Mechanism of coagulation of blood.
Mechanism of working of heart: Cardiac output, cardiac cycle, Origin & conduction of heart beat.

UNIT III: Muscle physiology and osmoregulation (15 Periods)

Structure of cardiac, smooth & skeletal muscle, threshold stimulus, All or None rule, single muscle twitch, muscle tone, isotonic and isometric contraction, Physical, chemical & electrical events of mechanism of muscle contraction.
Excretion: modes of excretion, Ornithine cycle, Mechanism of urine formation.

UNIT IV: Nervous and endocrine coordination (15 Periods)

Mechanism of generation & propagation of nerve impulse, structure of synapse, synaptic conduction, saltatory conduction, Neurotransmitters
Mechanism of action of hormones (insulin and steroids)
Different endocrine glands– Hypothalamus, pituitary, pineal, thymus, thyroid, parathyroid and adrenals, hypo & hyper-secretions.

PRACTICALS

1.Finding the coagulation time of blood
2.Determination of blood groups
3.Counting of mammalian RBCs
4.Determination of TLC and DLC
5.Demonstration of action of an enzyme
6.Determination of Haemoglobin

SUGGESTED READING

1.Guyton, A.C. & Hall, J.E. (2006). Textbook of Medical Physiology. XI Edition. Hercourt Asia PTE Ltd. /W.B. Saunders Company.
2.Tortora, G.J. & Grabowski, S. (2006). Principles of Anatomy & Physiology. XI

PLANT PHYSIOLOGY (Code: BBC-202)

UNIT I: Anatomy (10 Periods)

The shoot and root apical meristem and its histological organization, simple & complex permanent tissues, primary structure of shoot & root, secondary growth, growth rings, leaf anatomy (dorsi-ventraland isobilateral leaf)

UNIT II: Plant water relations and micro & macro nutrients (12 Periods)

Plant water relations: Importance of water to plant life, diffusion, osmosis, plasmolysis, imbibition, guttation, transpiration, stomata & their mechanism of opening & closing.

Micro & macro nutrients: criteria for identification of essentiality of nutrients, roles and deficiency systems of nutrients, mechanism of uptake of nutrients, mechanism of food transport

UNIT III: Carbon and nitrogen metabolism (20 Periods)

Photosynthesis- Photosynthesis pigments, concept of two photo systems, photphosphorylation, calvin cycle, CAM plants, photorespiration, compensation point

Nitrogen metabolism- inorganic & molecular nitrogen fixation, nitrate reduction and ammonium assimilation in plants.

UNIT IV: Growth and development (18 Periods)

Growth and development: Definitions, phases of growth, growth curve, growth hormones (auxins, gibberlins, cytokinins, abscisic acid, ethylene)

Physiological role and mode of action, seed dormancy and seed germination, concept of photo-periodism and vernalization

PRACTICALS

1.Preparation of stained mounts of anatomy of monocot and dicot's root, stem & leaf.
2.Demonstration of plasmolysis by *Tradescantia* leaf peel.
3.Demonstration of opening & closing of stomata
4.Demonstration of guttation on leaf tips of grass and garden nasturtium.
5.Separation of photosynthetic pigments by paper chromatography.
6.Demonstration of aerobic respiration.
7.Preparation of root nodules from a leguminous plant.

SUGGESTED READING

1.Dickinson, W.C. 2000 Integrative Plant Anatomy. Harcourt Academic Press, USA.
2.Esau, K. 1977 Anatomy of Seed Plants. Wiley Publishers.
3.Fahn, A. 1974 Plant Anatomy. Pergmon Press, USA and UK.
4.Hopkins, W.G. and Huner, P.A. 2008 Introduction to Plant Physiology. J. Wiley & Sons.
5.Mauseth, J.D. 1988 Plant Anatomy. The Benjammin/Cummings Publisher, USA.
6.Nelson, D.L., Cox, M.M. 2004 Lehninger Principles of Biochemistry, 4thedition, W.H. Freeman and Company, New York, USA.
7.Salisbury, F.B. and Ross, C.W. 1991 Plant Physiology, Wadsworth Publishing Co. Ltd.
8.Taiz, L. and Zeiger, E. 2006 Plant Physiology, 4th ed. Sinauer Associates Inc .MA, USA

ANIMAL DIVERSITY-I (Code: BBC-203)

UNIT I (15 Periods)

a).Outline of classification of Non-Chordates up to subclasses. Coelomata, Acoelomata, Symmetries, Deutrostomes, Protostomes.
b).Protozoa: Locomotion, Reproduction, evolution of Sex, General features of*Paramoecium* and *Plasmodium*. Pathogenic protozoans
c).Porifera: General characters, outline of Classification; skeleton, Canal System

UNIT II (15 Periods)

a).Coelenterata: General Characters, Outline of classifications, Polymorphism, Various types of stinging cells; Metagenesis, coral reefs and their formation.
b).Platyhelminthes- General Characters; Outline of classification; Pathogenic flatworms: Parasitic adaptations.
c).Aschelminthes: General features, Outline of classification, Pathogenic roundworms and their vectors in relation to man: Parasite adaptation.

UNIT III (15 Periods)

a).Annelida: - General features, Outline of classification, Coelom: Metameric segmentation, General features of Earthworm, Vermicomposting.
b).Arthropoda: General Features, Outline of Classification; Larval forms of crustacean, Respiration in Arthropoda; Metamorphosis in insects; Social insects; Insect vectors of diseases; Apiculture, Sericulture.

UNIT IV (15 Periods)

a).Mollusca : general features, Outline of classification, Shell Diversity; Torsion in gastropoda,
b).Echinodermata: General features, Outline of Classification Larval forms
c).Hemichordata: Phylogeny: Affinities of *Balanoglossus*

PRACTICALS

1. Identification and Classification of Any these of the following –
Porifera*: Scypha, , Leucosolenia, Euspongia, Hylonema, Euplectella Cnidaria: Medrepora, Millepora, Physalia, Porpita, Valella, Aurelia, Metridium* Platyhelminthes:*Taenia, Fasciola*, Aschelminthes*: Ascaris, Ancylostoma, Enterobius* Annelida: *Pheretima, Hirudinaria, Chaetopterus, Nereis, Aphrodite* Arthropoda: *Julus, Scolopendra, Peripatus, Carcinus, Limulus, Lepisma, Dragonfly, Musca, Acheta* Mollusca: *Pila, Unio, Mytilus, Loligo, Sepia, Octopus, Solen*
Echinodermata: *Asterias, Ophiothrix, Echinus, Holothuria, Astrophyton*
Hemichordata: *Balanoglossus*
2.Identification of slides with two points of identification.
Amoeba, Paramoecium, Ceratium, Plasmodium, Opalina, L.S. Sponge, Spicules of sponges, L.S. *Hydra, Obelia, Bougainvillia*, Larvae of *Fasciola,* Seta of Earthworm, Radula
3. Ecological Note – On any of the specimens in Exercise No 1
Models of dissection of Earthworm, Cockroach
Earthworm: Digestive, Nervous System,
Cockroach: Digestive Reproductive, Nervous System

SUGGESTED READING

1. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. & J.I., Spicer (2002) The Invertebrates: A New Synthesis. III Edition. Blackwell Science.
2. Barrington, E.J.W. (1979) Invertebrate Structure and Functions. II Edition. E.L.B.S. and Nelson.
3. Boradale, L.A. and Potts, E.A. (1961) Invertebrates: A Manual for the use of Students. Asia Publishing Home.
4. Bushbaum, R. (1964) Animals without Backbones. University of Chicago Press.
5. Kent, G.C. and Carr R.K. (2000). Comparative Anatomy of the Vertebrates. IX Edition. The McGraw-HillCompanies.

BIOETIHCS AND BIOSAFETY (Code: BBC-204)

UNIT-I (15 Periods)

Introduction to Indian Patent Law. World Trade Organization and its related intellectual property provisions. Intellectual/Industrial property and its legal protection in research, design and development. Patenting in Biotechnology, economic, ethical and depository considerations.

UNIT II (20 Periods)

Entrepreneurship: Selection of a product, line, design and development processes, economics on material and energy requirement, stock the product and release the same for making etc. The basic regulations of excise: Demand for a given product, feasibility of its production under given constraints of raw material, energy input, financial situations export potential etc.

UNIT III (10 Periods)

Bioethics – Necessity of Bioethics, different paradigms of Bioethics – National & International. Ethical issues against the molecular technologies.

UNIT IV (15 Periods)

Biosafety– Introduction to biosafety and health hazards concerning biotechnology. Introduction to the concept of containment level and Good Laboratory Practices (GLP) and Good Manufacturing Practices (GMP).

PRACTICALS

1. Proxy filing of Indian Product patent
2. Proxy filing of Indian Process patent
3. Planning of establishing a hypothetical biotechnology industry in India
4. A case study on clinical trials of drugs in India with emphasis on ethical issues.
5. Case study on women health ethics.
6. Case study on medical errors and negligence.
7. Case study on handling and disposal of radioactive waste

SUGGESTED READING

1. Entrepreneurship: New Venture Creation : David H. Holt
2. Patterns of Entrepreneurship : Jack M. Kaplan
3. Entrepreneurship and Small Business Management: C.B. Gupta, S.S. Khanka, Sultan Chand & Sons.
4. Sateesh MK (2010) Bioethics and Biosafety, I. K. International Pvt Ltd.
5. Sree Krishna V (2007) Bioethics and Biosafety in Biotechnology, New Age International Publishers