

2. Learn to investigate the light absorption properties of biomolecules through spectrophotometry, for qualitative and quantitative analysis of biomolecules.
3. Learn the concepts related to mechanics of solids and liquids to understand the basic mechanisms of cell biology especially cell adhesion, migration and mechanotransduction.
4. Learn about the mechanism of transport of various ions/molecules across cell membranes and their significance in several biological processes.

SEMESTER – II

BIOS02C-4: BIODIVERSITY

Credits - 6: (Theory- 04, Practical- 02)

Theory

Credit : 4

Contact Hours per Week : 4

Unit 1: Defining Biodiversity

Components of Biodiversity. Biodiversity crisis and biodiversity loss. Importance of biodiversity in daily life. Biodiversity and climate change. Types of Ecosystems: India as a megadiverse country. Hotspots and biodiversity in India. Biodiversity and Ecosystem functioning. Types of Biodiversity, microbial classification and diversity.

Unit 2: Modern Tools in the study of Biodiversity

Endemism, endemic plants and animals; Assessment of mapping of biodiversity; GIS/Remote sensing; Biotechnology and Conservation, IUCN; Germplasm banks, National Parks, Botanical Gardens; Wildlife Sanctuaries, Bio resources.

Unit 3: Crop Diversity

Wild relatives of cultivated plants; Domesticated diversity; Spice diversity; Forest diversity and wildlife.

Unit 4: Bio-prospecting

Representative type (one each) studies from Cryptogams, Phanerogams, Non-chordates and Chordates; Sacred flora and fauna. Bio-prospecting– Micro-organisms as a source of novel enzymes, antibiotics, antiviral agents; Immunosuppressive agents and other therapeutic agents. Botanicals for Biocontrol, Health and biodiversity.

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SEMESTER - IV

BIOS04C-8: SYSTEMS PHYSIOLOGY

Credits - 6: (Theory- 04, Practical- 02)

Theory

Credit : 4

Contact Hours per Week : 4

Unit 1: Movements and Bulk Transport

Cellular movements, ciliary and flagellar structure and function; Introduction to musculo-skeletal system; Terrestrial, aquatic and aerial locomotion; Locomotory cost; Long distance transport of water and nutrients in plants (xylem and phloem transport) ; General plan and physiology of circulatory system in vertebrates and invertebrates; Blood and body fluids - composition, haemopoiesis, haemoglobin, hemostasis, blood transfusion, anaemia; circulation in humans. Cardiovascular system -cardiac cycle, cardiac output, electrocardiography and arrhythmias.

Unit 2: Gas exchange in animals & humans

Role of respiratory pigments, significance of different lung volumes and capacities ; Generation and utilization of energy, Exchange in unicellular organisms and plants; Respiratory organs in aquatic and terrestrial systems ; Physiology of aquatic breathing and aerial breathing; Feeding patterns, physiology of human digestive system, regulation of digestion and absorption of foods.

Unit 3: Regulatory Physiology

Mechanism of opening and closing of stomata. Regulation of water and solutes in aquatic and terrestrial animals; Osmoregulatory organs Renal regulation of osmolarity,. Transpiration in plants; Excretion of nitrogenous wastes in animals and humans; Countercurrent multiplier and exchanger, Patterns of Thermoregulation: Ectotherms, Endotherms and homeotherms and their mechanism; Concept of Q10, Structural and functional adaptation to stress.

Unit 4: Integrative Physiology

An overview of the nervous system, Neurone -structure, types, properties and propagation of nerve impulse; Sensory physiology - receptors- types and potentials. Reflex action- types and properties. Endocrine systems in animals and humans and their physiological effects; Plant hormones and their physiological effects; Regulation of metabolism and response to environmental cues.

Practical

Credit : 2

Contact Hours per Week : 4

1. Effect of isotonic, hypotonic and hypertonic salines on erythrocytes
2. Identification of different histological sections. Identification of blood cells and differential counts.



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SEMESTER – VI

BIOS06DSE-4B: APPLIED HUMAN PHYSIOLOGY

Credits - 6: (Theory- 04, Practical- 02)

Theory

Credit : 4

Contact Hours per Week : 4

Unit 1: Nutrition and Dietetics

Nutrition, health and malnutrition; Constituents of food and their significance. Basal metabolic rate Respiratory quotient. Calorific value of foods. Body calorie requirements – adult consumption unit. Dietary requirements symptoms of deficiency and excess. Balanced diet and principles of formulation of balanced diets for growing child, adult man and woman, pregnant woman and lactating woman. Nutrition for different occupations. Nitrogen balance. Biological value of proteins, supplementary value of protein. Protein efficiency ratio and net protein utilization of dietary proteins; Dietary fibers. Principle of diet survey. Composition and nutritional value of common foodstuffs. Physiology of starvation and obesity. Elementary idea of glycaemic index; functional foods, nutraceuticals, probiotics and food supplements. Food adulterants and food additives.

Unit 2: Skin, sensation and higher neural function

Structure and functions of skin. Cutaneous circulation. Sweat glands Sweat formation, secretion and its regulation. Regulation of body temperature in homeotherms, pyrexia, hyperthermia and hypothermia Sensory receptors and function, Classification of general and special senses. Receptors as biological transducers. Physiology of Olfaction and Gustation, Acoustic physiology, Physiology of vision, Emotion, sleep, speech and aphasia

Unit 3: Regulation of Human Physiology

Hypothalamus as a neuroendocrine organ. Pineal gland, Hormones in Metabolism. Neuro immunology, Human Embryology,

Unit 4: Social physiology

Population problem, principles and methods of family planning. IVF. Malnutrition deficiency diseases and their social implications. Implications of Diabetes, CHD. Principles and social importance of immunization against diseases. Epidemiology and prevention of common diseases. Integration of systemic physiology and metabolism in daily life and disease. Life style diseases and management.

Unit 5: Work, Exercise and Sports Physiology

Concept of work. Muscle tone, posture and regulation, servo control mechanism. Physical work—its definition and nature. Power and capacity relation, Classification of workload. Exercise inducing equipment –Aerobic and anaerobic



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7	BIOS 0902G	Ergonomics, Occupational Health Management, Clinical Nutrition and Emerging Diseases <ul style="list-style-type: none"> • Ergonomics and Occupational Health Management: • Clinical Nutrition: • Emerging and Neglected Diseases: 	4
8	BIOS 902H	Advances in crop improvement <ul style="list-style-type: none"> • Plant Tissue Culture • Basics tools in Plant Biotechnology and Transgenics • Crop stress and productivity • Molecular Plant Breeding 	4

BIOS 0903: Journal club (at least three presentations) [50 marks; 4 credits]
BIOS 0991: Introduction and identification of research problem [50 marks; 4 credits]
BIOS 0992: Lab/ field work- standardization of protocols [50 marks; 4 credits]

PG SEMESTER-4

This semester will cover the dissertation projects and project related topics as well as developing research skills as preparation for PhD.

BIOS 1001: Project proposal for funding agency [50 marks; 4 credits]
BIOS 1002: Dissertation submission [50 marks; 4 credits]
BIOS 1003: Lab/ field work- methodology [50 marks; 4 credits]
BIOS 1091: Lab/ field work- interpretation and analysis of results [50 marks; 4 credits]
BIOS 1092: Dissertation presentation and interaction [50 marks; 4 credits]



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PG SEMESTER -1

BIOS 0701(Theoretical) [50 marks; 4 credits]

Methods and Experimental Design

BIOS 0702 (Theoretical) [50 marks; 4 credits]

Part 1- Advanced Cellular Biology [30 marks]

Part 2- Developmental Biology [20 marks]

BIOS 0703(Theoretical) [50 marks; 4 credits]

Part 1- Advanced Biochemistry [25 marks]

Part 2- Advanced Molecular Biology [25 marks]

BIOS 0791(Practical corresponding to BIOS 0702) [50 marks; 4 credits]

BIOS 0792(Practical corresponding to BIOS 0703) [50 marks; 4 credits]

PG SEMESTER – 2

BIOS 0801(Theoretical) [50 marks; 4 credits]

Part 1- Advanced Microbiology [25 marks]

Part 2- Immunology [25 marks]

BIOS 0802 (Theoretical) [50 marks; 4 credits]

Part 1-Advanced Genetics [30 marks]

Part 2- Environmental Science [20 marks]

BIOS 0803 (Theoretical) [50 marks; 4 credits]

Part 1- Emerging Trends in Life Sciences [25 marks]

Part 2- Homeostasis of Systems [25 marks]

BIOS 0891(Practical corresponding to BIOS 0801) [50 marks; 4 credits]

BIOS 0892(Practical corresponding to BIOS 0802) [50 marks; 4 credits]



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