AVICENNA INTERNATIONAL COLLEGE

BIOLOGICAL SCIENCES ACADEMIC CALENDAR

LECTURE SYLLABUS

CELL & MOLECULAR BIOLOGY

Session	Topic	Lecturer
1	Characteristics of Living Organisms, Levels of Organization in Biology (Introduction to Biology, Fields and Branches of Biology)	
2	Inorganic Compounds in our Body: Water, Minerals (Trace and Bulk Minerals and their Functions)	
3	Organic Compounds: Lipids, Carbohydrates (Fatty acids, Triglycerides, Phospholipids, Steroids, Monosaccharides, Disaccharides, Oligosaccharides, Polysaccharides)	
4	Proteins, Enzymes, Nucleic Acids (Amino Acids, Leves of Protein Structure, Nucleotides, DNA, RNA and its Types)	
5	Cell membrane, Junctions (Cell Membrane Lipids, Proteins, Oligosaccharides, Desmosomes, Hemidesmosomes, Gap Junctions, Tight Junctions)	
6	Membrane Receptors, Types of Signals and Receptors (Ion Channel Receptor, G-protein Receptor, Nuclear Receptor)	
7	Comparison of Passive and Active Transport, Simple Diffusion, Facilitated Diffusion	
8	Osmosis, Active Transport, Vesicular Transport	
9	Condensation of DNA, Chromatin, Chromosomes	
10	Human Karyotype	
11	Location and Number of Nucleus	
12	Structure of Nucleus	

Session	Topic	Lecturer
13	Endoplasmic Reticulum	
14	Ribosomes, Golgi, Lysosomes, Peroxysomes	
15	Origin and Structure of Mitochondrion and Chloroplast	
16	Glucose Catabolism: Glycolysis, Citric Acid Cycle, Oxidative Phosphorylation	
17	Photosynthesis (Dark and Light Stages)	
18	Cytoskeleton (Microfilaments, Intermediate filaments, Microtubules)	
19	DNA Replication in Eukaryotes (Definition, Semi-conservative Mechanism, Origins of Replication, Replication Bubbles, Mechanism of Replication)	
20	DNA Replication in Prokaryotes	
21	Central Dogma, Transcription (Definition of Transcription, Mechanism of Transcription, RNA Processing after Transcription, Transcription in Prokaryotes)	
22	Translation, Principle of Co-linearity	
23	Cell Cycle	
24	Mitosis and its Phases	
25	Meiosis (Phases of Meiosis, Gamete Production in Males and Females, Comparison of Mitosis and Meiosis)	
26	Comparison of Prokaryotic and Eukaryotic Cells	

GENETICS

Session	Topic	Lecturer
27	Concepts and Definitions of Mendelian Genetics (Introduction to Genetics, Mendelian vs Modern Genetics, Importance of Meiosis: Mechanisms Providing Variation)	
28	Laws of Mendel (Historical Background, Monohybrid Cross, Dihybrid Cross)	
29	Sex Determination, Sex-linked Inheritance (Dosage Compensation, Barr Body)	
30	Exceptions from Mendelian Genetics	
31	Pedigree Chart Examples	
32	Examples for Genetic and Chromosomal Diseases	
33	Mutations, Chromosomal Abnormalities, DNA Repair	
34	Gene Regulation, the Lac Operon	
35	Recombinant DNA Technology	
36	Basic Concepts of Evolution, Population Genetics	

MEDICAL MICROBIOLOGY

Session	Topic	Lecturer
37	Introduction to Microbiology, Classification of Pathogens	
38	Structure and Classification of Viruses, Viral Cycle (Introduction to Microbiology, Viral Diseases)	
39	Classification and Morphology of Bacteria (Comparison of Archaea and Eubacteria, Bacterial Diseases)	
40	Growth Pattern of Bacteria, Antibiotics	
41	Important Viral and Bacterial Diseases, Gastrointestinal Microbiota	
42	Fungi, Worms, Parasites/Protista (Malaria)	

IMMUNOLOGY

Session	Topic	Lecturer
43	Introduction to Immunology, Leukocytes, First Line of Defence	
44	Nonspecific Immune Response	
45	Specific Immune Response	
46	Types of Immunity (Vaccinations)	
47	Allergy, Inflammation, Antibodies	
48	Organ Transplant, Blood Transfusion/Blood Groups	

ANATOMY & HISTOLOGY

Session	Topic	Lecturer
49	Epithelial Tissue	
50	Types of Supportive and Connective Tissue (Bone, Cartilage, Tendons, Ligaments, Dense Connective Tissue, Loose Connective Tissue)	
51	Skin	
52	Structure of Bone, Basic Skeletal Morphology and Anatomy	
53	Types of Muscle Tissue, Muscle Contraction (Smooth Muscle, Skeletal Muscle, Cardiac Muscle)	
54	Basic Muscle Morphology and Anatomy	

PHYSIOLOGY

Session	Topic	Lecturer
55	Cardiovascular System, Morphology of the Heart	
56	Blood circulations in the Body, Lymphatic System	
57	Cardiac Cycle, Measuring the Activity of the Heart (ECG)	
58	Physiological Measures of the Cardiovascular System (Cardiac Output, Blood Pressure)	
59	Blood Vessels	
60	Blood, Coagulation, Hematopoiesis	

Session	Topic	Lecturer
61	Morphology of Respiratory System, Respiratory Movements	
62	Gas Exchange and Transport, Physiology and Diseases of Respiration	
63	Morphology of Digestive System	
64	Ingestion, Digestion, Absorption, Excretion	
65	Structure of Teeth	
66	Vitamins, Nutrients, Functions of the Liver, Lipid Metabolism	
67	Morphology of Urinary System	
68	Structure and Function of Nephrons, Regulation of Urine formation	
69	Nervous System Functions (Sensory and Motor Functions, Basic Division of Nervous System: CNS and PNS)	
70	Nervous Tissue, Synapse, Action Potential (Neurons, Glia Cells, Ganglia, Nerves; the Nerve Message: Formation and Conduction of Action Potential, Synapses)	
71	Brain Structure (Protection of Brain, Functions/Parts of Brain, Laterization of Brain)	
72	Functions of the Brain, Measuring the Activity of the Brain (EEG)	
73	Spinal Cord, Spinal Reflexes	
74	Peripheral Nervous System, Autonomic Nervous System	
75	Sensory Pathways, Smell, Taste, Skin Senses	
76	Morphology of the Eye, Mechanism of Vision	

Session	Topic	Lecturer
77	Morphology of the Ear, Hearing	
78	Sense of Balance, Vestibular System, Propioception	
79	Endocrine System, Hypothalamus, Hypophysis	
80	Classification of Hormones, Feedback Inhibition	
81	Thyroid, Pancreas, their Diseases	
82	Adrenal Gland, Gonads	
83	Morphology of Male Reproductive Organs	
84	Spermatogenesis, Spermiogenesis	
85	Morphology of Female Reproductive Organs	
86	Oogenesis, Ovarian Cycle, Menstrual Cycle (Hormonal Control)	
87	Types of Reproduction, Fertilization	
88	Development of Embryo	