Unit – I
Introduction to Immunology
Introduction to infection, sources of infection, methods of transmission of infection, Microbial pathogenicity
Immunity – innate and acquired immune response
Complements properties & function, complements pathway.
Lymphocytes - primary & secondary lymphoid organ

Unit – II
Serological Reaction
Antigen & antibody - Essential feature of antigen, Biology classes of antigens.
Antibody (immunoglobulin) - structure, properties & types,
Introduction & general feature of antigen - antibody reaction, measurement of antigen & antibody.
Precipitation reaction, application of precipitation reaction in disease and diagnosis, agglutination reaction, application of agglutination reaction.
Complement fixation test, Immunofluorescence, Radioimmunoassay, ELISA.
AIDS

Unit – III
MHC & Anti-Body Diversity
Major histocompatibility complex- organization of class I, II and III and their functions.
Molecular basis of antibody diversity.
Immunology of transplantation - classification of transplantation, allograft reaction, mechanism of allograft rejection.
Immunology of malignancy, tumour antigens, immune response in malignancy, Cancer.

Unit – IV
Hypersensitivity & Vaccination.
Hypersensitivity: types I, II, III & IV.
Auto immunity -introduction, mechanism of autoimmunization, name of various autoimmune diseases, Rheumatoid arthritis in Detail.
Vaccines & Vaccination: - types of immunization - passive & active, Routes of administration, Vaccination schedule.

Reference Books:
- Immunology by Kubey.
- Medical microbiology by Anatnarayan.
- Immunology by Roit, Male, 6th Edn.
Unit – I
Beneficial Microbiology
Difference b/w prokaryotes and eukaryotes.
Microbial cell wall – cell wall of gram + ve and – ve bacteria and its composition, acid fast and non-acid fast bacteria.
Synthesis of Precursor of peptidoglycan layer.
Synthesis of peptidoglycan layer
Role of antibiotics on cell wall biosynthesis.
Classification of bacteria, (Whitaker’s classification and modern classification). Microbial diversity

Unit – II
Fermentation of Primary & Secondary Metabolites
Introduction to fermentation process
Batch and continuous culture system.
Production of Alcohol,
Wine,
Vinegar,
Antibiotics (penicillin and streptomycin)

Unit – III
Isolation & Preservation of Indusatrial Important Microorganism
Isolation of industrial important Microorganism
Primary and Secondary Screening, enrichment technique
Preservation of Industrial important microbes
Different technique of preservation – low temperature storage on agar slopes, storage under liquid nitrogen and lyophylization.
Quality control of preserved stock culture
microbial culture collection centre.

Unit – IV
Processing & Fermentation of Milk
Types of milk and biochemical constituents
Microbial testing for milk
Production of milk products- yoghurt types and process, cheese types and process, kafir, kumiss.
Probiotics introduction and industrial importance.

Reference Books:
- Basic Microbiology by Power &Daginawala.
- Principle of fermentation technology by Stanbury&Whitakar.
- Practical Microbiology by Siorckin&Cullimore

SHRI GOVIND GURU UNIVERSITY
Programme: B. Sc.(Biochemistry) Semester: VI
Syllabus with effect from: June-2018

Paper Code: C – 3
Title of Paper: Hormone Biochemistry

Unit – 1

Unit – 2
Endocrine disorders : Gigantism, Acromegaly, dwarfs, pigmies; Pathophysiology: Diabetes insipidus. Thyroid Hormone (include biosynthesis) Goiter, Graves disease,

Hormones regulating Ca2+ Homeostasis: PTH, Vit D, Calcitonin .Pathophysiology : Rickets, Osteomalacia, Osteoporosis.

Unit – 3

Unit – 4

Other organs with endocrine function: Heart (ANP), Kidney(erythropoietin), Liver(Angiotensinogen, IGF-1), Adipose tissue( Leptin, adiponectin). Pathophysiology : Obesity.

Reference Books:
Syllabus with effect from: June-2018

Paper Code: C – 4
Title of Paper: Membrane Biology

Unit – 1

Unit – 2

Unit – 3

Unit – 4

Reference Books:
Paper Code: E – I
Title of Paper: Environmental Toxicology

Unit – I
Ecosystems: Wetland & Aquatic ecosystems – Water, Types of wetlands, Marine wetland ecosystems, Floodlands, Swamp & marsh ecosystems, Bog ecosystems, Aquatic ecosystems
Inter-relationships of ecosystems
Habitats & Niches: Habitats, Niches – Determining niches, Exclusion principle; Species coexistence – Size ratios
Niche overlap, Fundamental & raised niches, Resource partitioning, Character displacement, Interspecific competition
Trophic Levels: Autotrophs – Photoautotrophs, Chemoautotrophs; Decomposers – First floor, Dead plant matter
Herbivores & Carnivores, Omnvores, Food chains, Food webs, Pyramids of numbers, Pyramids of biomass, Pyramids of energy

Unit – II
Abiotic Transformations: Photochemistry, Oxidation, Reduction, Hydrolysis and Some other Abiotic Reactions
Biotransformations: Transformations by Microorganisms, Transformations in Animals and Higher Plants and Comparative Metabolism

Unit – III
Toxicological Chemistry
Toxicology of Some Inorganic Compounds: Nonmetallic Elements, Heavy Elements, The Metalloids, Transition Elements and Radioactive elements
Toxicology of Some Organic Compounds: DDT, DDE, Chlorinated Alicyclics, Polychlorinated Biphenyls, Phthalate Esters Chlorophenols and Esters
The role of environment in carcinogenesis, multi stage nature of carcinogenesis process, Selection of biomarker in event of toxic exposure.

Unit – IV
Genetic Toxicology: UVB and UVC induced DNA damage, DNA damage due to heavy metals and organic compounds.
Epigenetic changes, due to due to heavy metal (Cr, Pb, Cd, As, Hg) exposure, vinyl chloride, ethyl nitroso urea, Global DNA Hyper-methylation/Hypo-methylation due to heavy metal (Cr, Pb, Cd, metalloid As, Hg) exposure and Polycyclic aromatic hydrocarbon.
Apoptosis due to toxic exposure of metalloid As, Cd, Pd and pesticides.

Reference Books:

- Stanley EM. *Toxicological Chemistry and Biochemistry*. Lewis Publishers.
SHRI GOVIND GURU UNIVERSITY
Programme: B. Sc.(Biochemistry) Semester: V
Syllabus with effect from: June-2018

Paper Code: E – 2
Title of Paper: Genetics

Unit – I
Fundamentals of Genetics:
Introduction, Significance of genetics in agriculture, society and evolution; Mendel’s principle of inheritance (Experimental material, Laws formulated with reference to Mono- and Di-hybrid crosses, Test cross, Back cross) and Applications using Punnet square and Probability method; Mendel’s principle in Human genetics (Pedigrees and Genetic counseling). Concept of pseudo-alleles, Co-dominance, Incomplete dominance, Pleiotropy, Penetrance, Expressivity (Example of each).

Unit – II
Interaction of Genes and Sex determination
Sex determination
Introduction (Chromosome type and number), Mechanisms of Sex determination (Environmental Chromosomal and genic), Sex determination in animals (Drosophila, Reptiles and Mammals,) and Plants; Dosage compensation of x-linked gene

Unit – III
Linkage and Crossing over:
Introduction, Chromosome theory of Linkage, Coupling and Repulsion phase, Types of Linkage, Linkage groups and Linkage maps; Crossing over - Introduction, Theories on the mechanism of crossing over and Types of Crossing over.
Maternal effects and extra-chromosomal inheritance:
Maternal effects in snails, plastid inheritance in Mirabilis jalapa and male sterility in plants

Unit – IV
Chromosomal aberrations: {a} Alterations in chromosome number - Ploidy-Aneuploidy and Euploidy, Polyploidy and its significance in plants; Genetic disorders, Alteration in chromosome structure - Deletions, duplications, inversions and translocations, {b} Quantitative genetics, Polygenic inheritance, Gene and genotype frequency, Hardy-Weinberg law and its significance

Reference Books:
- Genetics – its concepts &implications .Anna C. Pai& Helen M. Roberts., Prentic – Hall Inc. Engle cliffs, New Jersey. USA