

Master Of Science (M.Sc) Course Description

520* BCH: Mechanisms of Enzyme Action	(3+1) credit-hours.
<p>General introduction. Theories of enzyme action. Forms of enzyme mechanisms (single and double-displacement mechanisms, substituted enzymes and ternary complexes, steady-state kinetics and analysis of two substrate formal mechanisms). The particulars of enzyme mechanisms (rate and equilibrium constants from steady state velocity and equilibrium studies, the direction of electron displacement, substrate analogues, thermodynamic and activation parameters, identification of specific groups, use of pH variation and group-specific reagents). Control of metabolism at the enzyme level (regulatory enzymes and sigmoid kinetics, coupled and cyclic systems). Regulation of enzymatic activity in the body. Mechanism of action of some individual enzymes.</p>	
530* BCH: Biochemical Methodology	(2+0) credit-hours.
<ul style="list-style-type: none"> v Spectrometry: spectrophotometry (scanning), I.R. analysis, spectrofluorimetry. v Chromatography: purification of proteins, affinity and/or hydrophobic chromatography. v Electrophoresis: polyacrylamide gel electrophoresis (e.g. LDH isoenzymes), SDS-polyacrylamide gel electrophoresis (molecular weight determination) Immunoelectrophoresis, isoelectric focusing. v Centrifugation: sub-cellular fractionation, molecular weight determination by sucrose density gradient. v Radioactive counting and radioimmunoassay v Gas chromatography of lipids v Transport of ions in biomembranes 	
540* BCH: Recent Advances in Metabolism and its Regulation	(3+0) credit-hours.
<p>Basic metabolism of carbohydrates, lipids and proteins and their interrelationships. Recent aspects in general metabolism. Hormonal, ionic, enzymatic and other factors involved in the regulation of metabolism.</p>	
545 BCH: Inborn Errors of Metabolism	(2+2) credit-hours.
<p>Chromosome basis of human heredity. Disorders of carbohydrate metabolism (pentosuria, diseases of fructose metabolism and glycogen storage diseases), amino acid metabolism (urea cycle disorders, disorders of folate metabolism), lipid and steroid metabolism (lipoprotein deficiency and hyperlipoproteinaemia, familial diseases of sterol metabolism), purine, pyrimidine, metals and porphyrin metabolism. Disorders of connective tissue, muscle and bone metabolism. Defects in the transport of carbohydrates, lipids, amino acids and steroids. Deficiency of circulating enzymes and plasma proteins.</p>	

550* BCH: Molecular Biology of the Gene	(1+1) credit-hours.
Review of the gene and its structure, transcription, replication and translation in prokaryotic cell, eukaryotic cell and viruses. Cell differentiation and the cell control of cell proliferation at the molecular level.	
555 BCH: Experimental Techniques in Molecular Biology	(3+0) credit-hours.
Isolation of DNA from virus and E. coli by sedimentation and Marmur extraction. DNA characterization and instability studies. RNA isolation and its secondary structure. Mapping of DNA using restriction endonucleases. mRNA and its translation. Hybridization kinetics (DNA labeling) . mRNA and its translation	
560 BCH: Biochemical Endocrinology	(0+2) credit-hours.
Central nervous system, endocrine glands, target tissues. The hormones of the pituitary gland, adrenal cortex, adrenal medulla, pancreas, thyroid gland, parathyroid glands and gonads: biosynthesis, releasing factors, effects, degradation and elimination, disorders of metabolism and assays. Prostaglandins and thromboxins.	
565 BCH: Biochemistry of Mammalian Reproduction	(2+1) credit-hours.
Brief review of mammalian reproductive system and the eukaryotic cell. Endocrinology of reproduction: the hormones of the pituitary gland, .the hormones of the thyroid gland, interrelation of the pituitary gland and ovary, interrelation of the hypothalamus and the pituitary gland. The hormones of reproduction: releasing factors, trophic and peptide hormones, gonadal hormones, prostaglandins, mechanism of hormone action. Biochemistry of the oestrous cycle, menstruation, ovulation and fertilization. Hormonal control of pregnancy. Function of the placenta. Androgens and the hormonal control of spermatogenesis. Parturition. Lactation. Hormonal control of fertility. Sterility. Birth control.	
570 BCH: Biochemistry of Cell Surface	(2+0) credit-hours.
Review of biomembrane structure (prokaryotic and eukaryotic cells). Passive and active transport in different membrane systems. Conduction of nerve impulses. Regulation of transport. Ionophores. Biosynthesis of membranes (plant cell walls, bacterial cell walls and cell coats). Structure and function of cell surface carbohydrates. Hormone receptors. Binding sites of antibodies. Erythroleukernia and its effect on cell membrane. Applications of synthetic liposomes and vesicles.	

575 BCH: Neurochemistry	(1+2) credit-hours.
<p>Organization of cells, properties of and axoplasmic flow, the brain and nervous system. Types of neurons, neuronal function, soma, axons, exoplasmic flow, and blood-brain barrier. Conduction and transmission of nerve impulses. Neurotransmitters. Review of brain and neural metabolism (carbohydrates, lipids, amino acids, peptides, proteins and nucleic acids). Biochemical mechanism of thinking. Biochemistry of mental illness.</p>	
577 BCH: Biochemistry of Blood	(2+0) credit-hours.
<p>Review of blood composition. Erythrocyte, leucocytes and platelet composition and metabolism. Hemoglobin and porphyrin metabolism. Metabolism of iron and its storage disorders. Factors affecting blood clotting mechanism. Inherited disorders of hemoglobin (e.g. hemoglobinopathies, porphyrias, sickle cell anemia). Bilirubin metabolism. Hyperbilirubinaemia.</p>	
580 BCH: Biochemistry of Human Nutrition	(2+0) credit-hours.
<p>Caloric significance of diets. Metabolic energy of carbohydrates, lipids and proteins. Total energy requirement and its expenditure. Significance of fiber in the diet. Vitamins: their absorption, excretion, functions, assay methods, and daily requirements. Vitamin malabsorption. Vitamin antagonists. Minerals in food and their importance in nutrition. Evaluation of fresh and preserved foods. Balanced diets. Application of nutrition to critical periods throughout the life span. Nutrition in pregnancy and lactation. Diets in some diseases. Body weight control with reference to nutrition (e.g. obesity, underweight, anorexia nervosa). Diets in some inborn errors of metabolism (e.g. galactosaemia, diabetes, phenylketonuria, maple syrup urine disease).</p>	
590 BCH: Selected Topics in Biochemistry	(3+0) credit-hours.
<p>Selected advanced topics, with emphasis on the latest developments.</p>	