

RKMVERI Syllabus for M. Sc. 3rd Semester Biochemistry

Course	Course Code	Credit
Laboratory operation and automation	MB301	2+1
Establishment and Use of reference values	MB302	2+1
Biochemical Techniques	MB303	2+1
Biomolecules	MB304	2+1
Tumor Markers	MB305	2
Diabetes	MB306	2
Organ disorders	MB307	2
Total		18

MB 301 Laboratory operation and automation

Method selection; Basic statistics; Basic concepts in relation to analytical methods; analytical goals; method comparison; basic concepts of automation; automation of analytical procedures; integrated automation for the clinical laboratory; other areas of automation.

MB 302 Establishment and use of reference values

Preanalytical variables; quality assurance; Fundamentals of total quality management (TQM); Implementing TQM; Personal competency and training; Total testing process; Control of pre-analytical variables; Control of analytical variables; External quality assessment and proficiency testing programs.

MB 303 Biochemical Techniques

Optical techniques (Photometry & Spectrophotometry, Reflectance Photometry, Atomic Absorption Spectrophotometry, Fluorometry, Phosphorimetry, Luminometry, Nephelometry and Turbidometry); Electrochemistry (Potentiometry, Voltammetry/Amperometry, Conductometry, Coulometry); Optical Chemical Sensors; Biosensors; Electrophoresis and Chromatography (description of technique & types); Enzymology (Basic principles; Enzyme kinetics; Analytical Enzymology); Immunoassays (Antigen-Antibody binding; Qualitative Methods; Quantitative Methods; Other Immunological Techniques).

MB 304 Biomolecules

Amino acids, peptides and proteins (Peptides and proteins; Analysis of Proteins; Plasma and Serum Proteins); Enzymes (Basic Concepts; Muscle Enzymes; Liver Enzymes; Pancreatic Enzymes; Other clinically important enzymes; Enzymes and Cardiovascular risk markers); Lipids; Vitamins; Minerals; Hemoglobin (Hemoglobin, Iron, Bilirubin, Porphyrins and porphyrias).

MB 305 Tumor Markers

Clinical applications; Evaluating clinical utility; Clinical guidelines; Analytical methods; Enzymes; Hormones; Oncofetal antigens; Cytokeratins; Carbohydrate markers; Blood group antigens; Proteins; Receptors; Circulating Tumor; Genetic and Molecular Markers; Other Molecular Tests; Microarray-Based Markers.

MB 306 Diabetes

Classifications; Hormones that Regulate Blood Glucose Concentration; Measurement of Insulin; Proinsulin; C-Peptide; Glucagon; Pathogenesis of Type 1 and Type 2 Diabetes Mellitus; Diagnosis of Diabetes; Chronic Complications of Diabetes Mellitus; Role of the Clinical Laboratory in Diabetes Mellitus; Self-Monitoring of Blood Glucose; Alternatives to Meters for Monitoring of Blood; Abnormalities of Porphyrin Metabolism; Glucose, Ketone bodies, Glycated proteins, Urinary albumin excretion.

MB 307 Organ Disorders

Disorders of Bone Metabolism (Overview of Bone and Mineral Metabolism, Calcium, Phosphate, Magnesium, Hormones Regulating Mineral Metabolism, Integrated control of Mineral Metabolism, Biochemical Markers of Bone Turnover, Metabolic Bone); Pregnancy, Neonate and new-born testing (Maternal and Fetal Health Assessment, Prenatal Screening for Fetal Defects; Inheritance Pattern of metabolic Disorders; Newborn Screening; Inborn Errors of Metabolism; Diagnostic Tests for Inherited Disorders of Metabolism); Liver Disease (Liver Functions and diagnostics strategy of diseases); Kidney Disease (Kidney function and RFTs); Cardiac Disease (Brief anatomy and physiology of the heart, Cardiac diseases and biomarkers).

Practical (In tandem with the theory paper)

Estimation of enzymes by colorimetry

Estimation of enzymes by a semi-automated method

Estimation of enzymes by a fully automated method

Calculation of precision

Understanding and interpretation of Levey Jennings Chart

Understanding and interpretation of proficiency testing progress

Preparation and run of internal quality materials

Preparation and run of proficiency testing materials

Analytic estimation by mass spectrometry

Immunoassay performance on automated platforms

Run and interpretation of chromatography

Seminars

Monthly topic as decided by the Department