KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL

Re-Accredited by NAAC with Grade "A"

(w. e. f. 2019-2020)

DEPARTMENT OF BIOTECHNOLOGY

II B.Sc – III SEMESTER SYLLABUS

Paper III - BIOPHYSICAL TECHNIQUES

UNIT I- Centrifugation :

Basic principles, concept of RCF, types of centrifuges (clinical, high speed and ultra centrifuges).

Preparative centrifugation: Differential and density gradient centrifugation, applications (Isolation of cell components).

Analytical centrifugation: Sedimentation coefficient, determination of molecular weight by sedimentation velocity and sedimentation equilibrium methods.

UNIT II - Spectrophotometry:

Concept of electromagnetic radiation, spectrum of light, absorption of electromagnetic radiations, Concept of chromophores and auxochrome in absorption of electromagnetic radiations.

Absorption spectrum and its uses, Beer's law-derivation and deviations, extinction coefficient.

Difference between spectrophotometer and colorimeter.

Principles and applications of UV and visible spectrophotometry.

Spectro fluorimetry : Principle, instrumentation and applications.

Absorption & emission flame photometry: Principle, instrumentation and application.

Principles & applications of IR, NMR and Mass spectrometry

UNIT III - Chromatography:

Partition principle, partition coefficient. Brief account of paper chromatography, thin layer chromatography and column chromatography.

Gel filtration Chromatography and its applications,

Ion-exchange chromatography: Principle & applications,

Affinity chromatography : Principle & applications,

Gas chromatography (GC) and High Pressure Liquid chromatography (HPLC).

UNIT IV - Electrophoresis :

Basic Principle, Migration of ions in electric field, Factors affecting electrophoretic mobility.

SDS-PAGE electrophoresis: Applications (determination of molecular weight of protein,

molecular biology applications).

Isoelectric focusing & Pulsed-field gel electrophoresis- Principle & applications.

UNIT V - Isotopic tracer technique and applications of radioisotopes

Radioactive & stable isotopes, rate of radioactive decay. Units of radioactivity.

Measurement of radioactivity: Ionization chambers, proportional counters,

Geiger-Muller counter (basic principle, instrumentation and technique).

Principles of tracer technique, advantages and limitations, applications of isotopes in biotechnology (distribution studies,metabolic studies, isotope dilution technique, metabolic studies, clinical applications, autoradiography).

REFERENCE BOOKS :

1. Principles of Biochemistry By: Donald J. Voet, Judith G.Voet, Charlotte W.Pratt

2. Analytical Biochemistry By Cooper

3. Principles and techniques of Biochemistry and Molecular Biology Edited By Keith Wilson and John Walker

4. Experimental Biochemistry: A Student Companion by Sashidhar Beedu et al

5. Practical Biochemistry By Plummer

6. Upadhyaya and Upadhyaya Physical biochemistry

KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL
Re-Accredited by NAAC with Grade "A"

II B.Sc BIOTECHNOLOGY

(w.e.f. 2019-2020)

SEMESTER III : PRACTICAL PAPER – III

BIOPHYSICAL TECHNIQUES

1. UV Absorption spectrum of Nucleic Acids
2. Spectrophotometric analysis of DNA denaturation.
3. Determination of purity of DNA.
4. Paper chromatography of amino acids/ sugars.
5. Cellular fractionation and separation of cell organelles using centrifuge.
6. TLC of amino acids/ sugars.
7. Gel electrophoresis of Nucleic acids.
8. SDS-PAGE.

KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL

Re-Accredited by NAAC with Grade "A"

(w. e. f. 2019-2020)

DEPARTMENT OF BIOTECHNOLOGY

II B.Sc – IV SEMESTER SYLLABUS

Paper IV – IMMUNOLOGY AND VACCINOLOGY

UNIT I – Immunology :

Overview of Immune system: Organs and cells of immune system. Immunity- Innate immune mechanism, Acquired immune mechanism, Humoral and Cell mediated Immune system, ADCC) . Antigen, Antigenecity (factors affecting antigenicity), Epitopes, Haptens.

UNIT II : Antibodies :

Antibody structure and classes, Antibody diversity, Genes of antibodies. Cytokines and brief idea of MHC, Main pathways of complement system.

UNIT III- Hypersensitivity :

Hypersensitivity and Vaccination:General features of hypersensitivity, various types of hypersensitivity, Immediate and Delayed type hypersensitivity .

Vaccination: Discovery ,principles, significance.

Concept of autoimmunity.

UNIT IV - Immunological Techniques :

Antigen- antibody reactions: Precipitation , agglutination , complement fixation, immune diffusion, ELISA.

Hybridoma technology: Monoclonal antibodies and their applications in immuno diagnosis.

UNIT V – Transplantation and Cancer Immunology :

Transplantation antigens, Tissue typing, Skin Grafting, Graft Rejection, Mechanism involved in Graft rejection, Clinical manifestations of Graft rejection Clinical Transplantation- Kidney, Bone marrow, Heart transplantation.

Oncogenes and Cancer Induction- Function of Cancer Associated genes, Regulation of Programmed Cell Death, Tumor Antigens- Tumor specific antigens, Tumor Associated Antigens,Cancer Immunotherapy- Cytokine therapy, Monoclonal antibodies.

REFERENCE BOOKS

1. Abbas AK, Lichtman AH, Pillai S. (2007). Cellular and Molecular Immunology. 6 th edition Saunders Publication, Philadelphia.

2. Delves P, Martin S, Burton D, Roitt IM. (2006). Roitt's Essential Immunology. 11th edition Wiley-Blackwell Scientific Publication, Oxford.

3. Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.

4. Murphy K, Travers P, Walport M. (2008). Janeway's Immunobiology. 7th edition Garland Science Publishers, New York.

5. Peakman M, and Vergani D. (2009). Basic and Clinical Immunology. 2nd edition Churchill Livingstone Publishers, Edinberg.

6. Richard C and Geiffrey S. (2009). Immunology. 6th edition. Wiley Blackwell Publication.

KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL
Re-Accredited by NAAC with Grade "A"

II B.Sc BIOTECHNOLOGY

(w.e.f. 2019-2020)

SEMESTER IV : PRACTICAL PAPER – IV

IMMUNOLOGY AND VACCINOLOGY

1. Antigen antibody reaction – Determination of Blood group
2. Pregnancy test
3. Widal test
4. Ouchterlony immuno diffusion
5. Radial immunodiffusion
6. Differential Count
7. RBC Count
8. WBC Count
9. Estimation of haemoglobin by Sahli's method
10. VDRL Test