

**SRI VENKATESWARA UNIVERSITY**  
**B.Sc. DEGREE COURSE IN BIOTECHNOLOGY**  
**III- SEMESTER**  
**(Revised Syllabus under CBCS w.e.f. 2021-22)**

**BT-301: Immunology and r DNA Technology**

**Course Objectives:** To acquaint students with concepts of immunology and recombinant DNA technology. This course is aimed to give an understanding of the basics of immunology dealing cells and organs of the immune system, types of immune responses, antigen-antibody interactions, vaccines and tools, techniques and strategies and applications of genetic engineering.

**Unit- I –Concepts, Cells and Organs of the Immune System**

Terminology, antigen, happen, antibody (types), antigen city, immunogenicity and types of immunity. Innate and adaptive immunity. Haematopoiesis, organs, tissues, cells and mediators of the immune system (primary and secondary lymphoid organs, lymphocytes and cytokines). Introduction to complement components, MHC. Basic concepts of humeral and cell-mediated immune response.

**Unit-II-Vaccinology and Clinical Immunology**

Live, killed, attenuated, subunit and recombinant vaccines. Role and properties of adjuvant. Hybridism technology, monoclonal antibodies and their application in immunodiagnostic. Antigen and antibody interactions - precipitation, agglutination, immune diffusion and ELISA. Introduction to hypersensitivity and autoimmunity.

**Unit-III – Introduction, Tools and Techniques of r DNA Technology**

Introduction to r DNA technology, steps involved in cloning, tools of genetic engineering (Genes, Cloning vectors - plasmids and cosmos, Enzymes – restriction end nucleases and DNA Lipase, Hosts – bacteria and yeast). Principles and application of PCR. Southern, Northern and Western Blotting. Introduction to DNA sequencing (Sanger Sequencing) and Site-directed Mutagenesis.

## **Unit-IV-Cloning Strategies and Application of r DNA Technology**

c DNA library, construction, methods of transformation, recombinant selection and screening methods. Applications of r DNA technology in agriculture (transgenic plants, edible vaccines and antibodies) and medicine (disease diagnosis and DNA fingerprinting).

## **Unit-V-Bioinformatics**

Databases (Pub Med, NCBI, EMBL and Expose), nucleotide and protein BLAST analysis, Clustal W and phyla genetic tree construction. Introduction to omics (proteomics, genomics and trans cryptomics). Introduction to nanotechnology.

### **List of Practical's:-**

1. Determination of Blood Groups
2. Pregnancy test
3. Widely test
4. Ocuteroloney immune diffusion
5. Radial immune diffusion
6. ELISA
7. Production of antibodies (theory exercise)
8. Bleeding, separation of serum and storage
9. Lymphoid organs (theory exercise)
10. Isolation of plasmid DNA (alkaline lyses method)
11. Analysis of plasmid DNA by Agars gel electrophoresis
12. Southern blotting (theory exercise)
13. PCR Amplification (theory exercise)

### **Textbooks for Immunology and r DNA technology**

1. Cubby immunology, Judy Owen, Jenny Punt, Sharon Stanford., 7th edition (2012), Freeman and Co., NY
2. Textbook of basic and clinical immunology, 1st edition (2013), Soda Gangly and Shebang Snake, University Press, India
3. Immunology, 7th edition (2006), David Male, Jonathan Brest off, David Roth, Ivan Riot, Mosby, USA.
4. Immune diagnostics, 1996, By S.C. Restage, Pub: New Age
5. Introduction to Immunology- 2002, C. V. Rae- Nervosa Publishing House
6. Textbook of Biotechnology - 2007, By H.K. Das (Wiley Publications)

7. Principles of Gene Manipulation - 7<sup>th</sup> edition, 2006, By R.W. Old & S.B. Primrose, Pub: Blackwell
8. Molecular Biology & Biotechnology- 1996, By H.D. Kumar, Pub: Visas
9. Molecular Biotechnology - 4<sup>th</sup> edition, 2010, G.R. Click and J.J. Pasternak, Pub: Panama
10. Genes and Genomes – 1991, By Maxine Singer and Paul Berg
11. Genes VII- 2000, By B. Lewis - Oxford Univ. Press
12. Molecular Biology - 4<sup>th</sup> Edition, 2008, By D. Free folder, Pub: Nervosa Publishing house New York, Delhi
13. Brown TA. (2006). Gene Cloning and DNA Analysis. 5th edition. Blackwell Publishing, Oxford, U.K.
14. Clark DP and Pasternak NJ. (2009). Biotechnology-Appling the Genetic Revolution. Elsevier Academic Press, USA.
15. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology-Principles and Applications of recombinant DNA. ASM Press, Washington
16. Primrose SB and Twyla RM. (2006). Principles of Gene Manipulation and Genomics, 7<sup>th</sup>edition. Blackwell Publishing, Oxford, U.K.
17. Sam brook J, Fritsch EF and Maneates T. (2001). Molecular Cloning-A Laboratory Manual. 3rdedition. Cold Spring Harbour Laboratory Press.
18. Introduction to Bioinformatics – 2007, By V. Kothekar
19. Introduction to Bioinformatics – 2013, By Arthur M. Lusk
20. Bioinformatics: 2001, Sequence and Genome Analysis by David W. Mount, Cold Spring Harbour Laboratory Press
21. Biological Sequence Analysis: 1<sup>st</sup> Edition, 1998, Probabilistic Models of Proteins and Nucleic Acids by Richard Durbin, Sean R. Eddy, Anders Krogh, Graeme Murchison, Cambridge University Press
22. Bioinformatics: 2004, A Practical Guide to the Analysis of Genes and Proteins, Andreas D. Bade vanes, B. F. Francis Ouellette, Wiley-Inter science
23. Bioinformatics tools and Resources – free online tools, software packages, Bioinformatics books and Journals, Bioinformatics web-portals

# **SRI VENKATESWARA UNIVERSITY**

**B.Sc. DEGREE COURSE IN BIO-TECHNOLOGY**

**W.E.F. 2021-22**

## **MODEL QUESTION PAPER**

Time: 3 hours

Marks: 75 marks

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks.

### **PART - A**

**Answer any Five of the following question.**

**(5X5=25M)**

<b>1.</b>	
<b>2.</b>	
<b>3.</b>	
<b>4.</b>	
<b>5.</b>	
<b>6.</b>	
<b>7.</b>	
<b>8.</b>	

**PART – B**

**Answer All The Questions. Each question carries 10 marks (5X10= 50M)**

9.	(A)  OR  (B)
10.	(A)  OR  (B)
11.	(A)  OR  (B)
12.	(A)  OR  (B)
13.	(A)  OR  (B)