



Pithapur Rajah's Government College(Autonomous)Kakinada

Program
&Semester
III B.Sc
Semester -IV

CourseCode	IMMUNOLOGY			
Teaching	Hours Allocated: 60 (Theory)			
Pre-requisites:	L	T	P	C
	3	-	-	3

I. LEARNING OUTCOMES

On successful completion of the course, the students will be able to

1. Learn about types of immunity and cells of immunity
2. Learn about Antigen and Antibody
3. Learn about cell , humoral immunity and MHC molecules
4. Learn about Hypersensitivity and vaccines
5. Learn about immunological techniques

II. Syllabus

UNIT I Immune system:

- 1.1 History and scope of immunology.
- 1.2 Cells of the immune system -T cells , B cells
- 1.3 Immunity, innate immune mechanism, Acquired immune mechanism
- 1.4 Organs of the immune system (Bone marrow, spleen thymus MALT)

UNIT II Antibody and Antigen:

- 2.1 Antibody structure and classes(Ig G,Ig M Ig A Ig E I g D , Antibody diversity
- 2.2 Antigen -Types of Antigens
- 2.3 Antigenicity (factors affecting antigenicity).
- 2.4 Antigenic determinants – adjuvants and haptens , epitopes

UNIT III Immunity:

- 3.1 Humoral immunity
- 3.2 Cell-mediated immunity -TC-mediated immunity, NK cell-mediated immunity, ADCC.
- 3.3 Brief description of cytokines , Interleukins
- 3.4 Major histocompatibility complex (MHC)-Structure and Functions of Class I , II MHC Molecules

UNIT IV - Hypersensitivity and vaccination

- 4.1 General features of hypersensitivity,
- 4.2 Types of hypersensitivity
- 4.3 Vaccination: Discovery, principles, significance,
- 4.4 Types of Vaccines -live, attenuated, killed , recombinant, subunit

UNIT V Immunological Techniques

- 5.1 Antigen-antibody reactions: Precipitation, agglutination, complement fixation,
- 5.2 Immunodiffusion - Radial immune diffusion, Ouchterlony double immune diffusion
- 5.3 Hybridoma technology: Monoclonal antibodies and their applications in immunodiagnostic.
- 5.4 ELISA , RIA , immunoelectrophoresis , Rocket electrophoresis




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1. Antigen – antibody reaction – determination of Blood group , Cross reactivity
2. Pregnancy test
3. Widal test
4. Ouchterloney immunodiffusion
5. Radial immunodiffusion
6. ELISA
7. Isolation of casein by isoelectric precipitation
8. Production of antibodies and their titration

	Pithapur Rajah's Government College (Autonomous) Kakinada	Program & Semester III B.Sc Semester -IV			
CourseCode	BIOINFORMATICS AND BIOSTATISTICS				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:		3	-	-	3

I. LEARNING OUTCOMES

On successful completion of the course, the students will be able to

1. Learn about concept and branches of bioinformatics
2. Learn about searching sequences using databases
3. Learn about computer phylogenetics
4. Learn about the measurement of central tendency
5. Learn about test hypothesis

UNIT - I

- 1.1 Scope of computers in biological research, Introduction to Bioinformatics: Definition, nature and scope of bioinformatics.
- 1.2 Bioinformatics versus computational biology.
- 1.3 Branches of bioinformatics.
- 1.4 Basic concepts in bioinformatics.

UNIT – II

- 2.1 Basic concepts of system biology. Protein Data Bases -visualization of proteins using database
- 2.2 Overview of computer-aided drug design.
- 2.3 Searching sequence database using BLAST.
- 2.4 Concept of genomics and proteomics

UNIT – III

- 3.1 Computational phylogenetics – various applications.
- 3.2 Phylip software.
- 3.3 Microarray,
- 3.4 Bio informatics – Experimental design & Over view of data analysis.

UNIT – IV

- 4.1 Measurement of central tendency (mean, mode and range)
- 4.2 Dispersion (standard error and standard deviation).
- 4.3 Probability and distribution. Poisson and binomial distributions.
- 4.4 Normal distribution

UNIT – V

- 5.1 Population and sampling test of significance. Test hypothesis.
- 5.2 Student t-test for small samples. ANOVA – Two – Way ANOVA,
- 5.3 Correlation and regression.
- 5.4 Computer applications in Biotechnology




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Pre-requisites:		-	-	2	1

1. Mean, Median, Mode
2. Standard deviation, variance and coefficient of variation
3. Testing of hypotheses regarding population mean
4. Testing of hypotheses about the difference between population means
5. Chi-square test
6. Testing of Correlation Coefficient
7. Fitting of simple linear regression
8. Sequence retrieval (protein and gene) from NCBI, Structure download (protein and DNA) from PDB

	Pithapur Rajah's Government College (Autonomous) Kakinada		Program & Semester III B.Sc Semester -IV			
CourseCode	MEDICAL BIOTECHNOLOGY					
Teaching	Hours Allocated: 60 (Theory)		L	T	P	C
Pre-requisites:			3	-	-	3

I. LEARNING OUTCOMES

On successful completion of the course, the students will be able to

1. Learn about diseases caused by microbial sources
2. Learn about epidemiology, pathogenicity, laboratory, diagnosis, prevention and control of bacterial diseases
3. Learn about fungal, viral and protozoan diseases
4. Learn about gene therapy and vectors used in gene therapy
5. Learn about drug discovery, therapeutic applications

UNIT -I

- 1.1 Diseases, introduction, types : genetic, chromosomal aberrations, numerical and structural autoimmune disorders
- 1.2 Disease caused by microbial sources, mechanism of pathogenicity, pathogenic islands.
- 1.3 Molecular basis of diseases
- 1.4 Antimicrobial compounds and their mode of action

Unit -II

- 2.1 Characteristics of infectious diseases, herd immunity
- 2.2 Disease cycle (source of disease, reservoir, carries).
- 2.3 Transmission of pathogens (air borne ,contact transmission , and vector transmission)
- 2.4 Bacterial diseases – epidemiology, pathogenicity, laboratory, diagnosis, prevention and control of the following diseases – tuberculosis, typhoid, tetanus, leprosy

Unit -III

- 3.1 General account of fungal diseases : mycosis , subcutaneous and deep
- 3.2 General account of viral and protozoan diseases- pneumonia, mumps,
- 3.3 AIDS, malaria
- 3.4 Brief account of sexually transmitted diseases

Unit -IV

- 4.1 Gene therapy – *Exvivo, Invivo, Insitu* gene therapy
- 4.2 strategies of gene therapy, gene augmentation
- 4.3 Vectors used in gene therapy, biological vectors – retrovirus, adeno virus, herpes.
- 4.4 Syntheticvectors - liposomes, receptor medicate gene transfer

Unit -V

- 5.1 Introduction to drug discovery. Stem cell-based drug discovery.
- 5.2 Drug screening and toxicology
- 5.3 Therapeutic applications – neurological disorders - Parkinson's diseases, Alzheimer's disease
- 5.4 Antiviral therapy for AIDS, DNA/RNA based diagnosis, hepatitis