



**SILVER OAK
UNIVERSITY**

EDUCATION TO INNOVATION

(Established under Gujarat Private Universities Act, 2009)

SEMESTER – VI

- Fundamentals of Immunology
- Genetic Engineering
- Project Work



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Subject: - Fundamentals of Immunology								
Program: B.Sc.				Subject Code:			Semester: IV	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
04	-	4	6	24/60	20/50	16/40	-	150

THEORY

Unit: 1 INNATE HOST RESISTANCE

- a. Innate resistance overview
- b. Physical and chemical barrier: Defense of innate resistance
- c. Chemical mediator in innate resistance
- d. Cell tissues and organs of the immune system
- e. Phagocytosis Inflammation

Unit: 2 ADAPTIVE IMMUNITY

- a. Overview of Adaptive
- b. Immunity Antigen
- c. Types of adaptive immunity
- d. Recognition of foreignness
- e. T-Cell biology
- f. B-Cell biology
- g. Antibodies and monoclonal antibody

Unit: 3 CLINICAL IMMUNOLOGY

- a. Serotyping and Agglutination
- b. Complement fixation
- c. Immunoblotting and Immunoprecipitant
- d. Immunodiffusion and Immunoelectrophoresis
- e. Radioimmunoassay
- f. ELISA

Unit: 4 IMMUNE TOLERANCE AND IMMUNE DISORDERS

- a. Acquired immune tolerance
- b. Immunodeficiency



- c. Autoimmunity and Autoimmune diseases
- d. Hypersensitivity

PRACTICAL

1. Widal test – Dreyer’s Double Dilution
2. RPR test – Qualitative
3. Determination of blood groups

REFERENCES:

- Wiley, J., and Sherwood, L. (2014). Prescott, Harley and Klein’s Microbiology, 9 Ed., McGraw-Hill Science/Engineering/Maths.
- Tortora G. J., Funke B. R. and Case C. L., (1997), Microbiology: An Introduction, 6th ed., Addison Wesley Longman Inc.
- Pommerville J. C., (2014), Alcamo’s fundamentals of microbiology, 10th ed., Jones and Bartlett learning
- Pelczar, Chan and Krieg, (1993), Microbiology-Concepts and Application, International Edition, McGraw-Hill



Subject: - Genetic Engineering								
Program: B.Sc.				Subject Code:			Semester: IV	
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04	-	4	6	24/60	20/50	16/40	-	150

THEORY

Unit:1

- a. Introduction to genetic engineering, gene cloning and its ethical consideration
 - ii. Outlines of rDNA technology and its application
 - iii. Gene libraries - DNA sequencing, gene bank; screening gene libraries – nucleic acid hybridization, colony and plaque hybridization, immunological detection, gene probes, complementation of mutants

Unit: 2

- a. Tools of genetic engineering/rDNA technology Enzymes: restriction endonucleases, RNA polymerase, DNA ligase, alkaline phosphatase, polynucleotide kinase, reverse transcriptase Cloning vectors- plasmids, bacteriophages, cosmids, Ti, YEP

Unit: 3

- a. Selection of genes based on – function, physical differences, complementary RNA, synthetic nucleotide primers
- b. Isolating genes for known proteins, unknown gene products, chemical synthesis of genes, PCR, site – directed mutagenesis

Unit: 4

- a. Genetic engineering of microorganisms (applications) – production of whole cells, SCP, small biological molecules (GA, citric acid, lactic acid, gluconic acid, glutamic acid, lysine, vitamins), alcohol, antibiotics, high molecular weight compounds (biopolymers, proteins and other products) Application in medicine – human proteins, recombinant vaccines, human vaccines



- b. Agriculture and environment – soil fertility, plant growth enhancement, insecticides, environmental pollution remediation

PRACTICAL

1. Conjugation,
2. Transformation
3. Recombination

References:

- Biotechnology – fundamentals and applications, (4th Ed.) – S. S. Purohit.
- Molecular Biotechnology – Principles and practices – Channarayappa
- Principles of Gene Manipulation – Old and Primrose, Blackwell scientific Publications
- Molecular Biotechnology - Primrose



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00	-	12	6	-	-	-	150	150