

**M. Sc. Integrated Biotechnology Course**  
**Veer Narmad South Gujarat University, Surat**

Semester	Semester I & II (24 Credits)						Total Credits
	Theory			Laboratory Work			
	Course	Credit	hours	Course	Credit	Hours	
Foundation Compulsory	1	2	3	-	-	-	2
Generic Elective	1	2	3	-	-	-	2
<b>Core 1</b>	2	4	6	1	2	4	6
<b>Core 2</b>	2	4	6	1	2	4	6
<b>Core 3</b>	2	4	6	1	2	4	6
Foundation Elective	1	2	2	-	-	-	2
<b>Total</b>	9	<b>18</b>	<b>26</b>	3	<b>6</b>	<b>12</b>	<b>24</b>

**Semester-II**

**Core 1: Biotechnology**

Course 1: BT 03: Basic Biochemistry

Course 2: BT 04: Fundamentals of Genetics

**Practical Core 1: BTP 02: Biotechnology Semester-II**

**VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT**  
**M. Sc. Integrated Biotechnology**  
**Syllabus: Semester-II**

**CORE: 1; Course: 01**  
**BT 03: Basic Biochemistry**

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- UNIT 1: CARBOHYDRATES**
- 1.1 Introduction to carbohydrates
  - 1.2 Classification of carbohydrates
  - 1.3 Chemical properties
  - 1.4 Glycosidic linkage
  - 1.5 Disaccharides
  - 1.6 Oligosaccharides
  - 1.7 Homopolysaccharides and Heteropolysaccharides
  - 1.8 Functions of carbohydrates
- UNIT 2: AMINO ACIDS AND PROTEINS**
- 2.1 Amino acids
    - 2.1.1 Introduction to Amino acids
    - 2.1.2 Classification
  - 2.2 Proteins
    - 2.2.1 Classification
    - 2.2.2 Chemical structure
    - 2.2.3 Structure of proteins
    - 2.2.4 Properties of proteins
    - 2.2.5 Biological importance of proteins
- UNIT 3: NUCLEIC ACIDS**
- 3.1 Relations among nucleic acids, nucleotides and nucleosides
  - 3.2 Structure of DNA: Watson and Crick Model
  - 3.3 Different forms of DNA duplex
  - 3.4 Structure of RNA
  - 3.5 Types of RNA
- UNIT 4: LIPIDS**
- 4.1 Classification of lipids
  - 4.2 Characterization of fats
  - 4.3 Compound lipids
  - 4.4 Biological functions of lipids

**REFERENCES:**

1. Cox, M. M., & Nelson, D.L., (2008). *Lehninger Principles of Biochemistry*, 5Ed. W. H. Freeman, New York.
2. Powar, C.B., & Chatwal, G.R., (2002). *Biochemistry*, Himalaya Publishing House, India.

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**M. Sc. Integrated Biotechnology**  
**Syllabus: Semester-II**

**CORE: 1; Course: 02**  
**BT 04: Fundamentals of Genetics**

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**UNIT 1: MENDELIAN VIEW OF THE WORLD**

- 1.1 Mendel's discoveries.
- 1.2 Chromosomal theory of heredity.
- 1.3 Gene linkage and crossing over.
- 1.4 Chromosome mapping.
- 1.5 Origin of genetic variability through mutations.

**UNIT 2: DNA AS GENETIC MATERIAL**

- 2.1 In Bacteria
- 2.2 In Viruses
- 2.3 In Animal cells
- 2.4 Semi-conservative replication of DNA
- 2.5 Hybridization of Nucleic acids.

**UNIT 3: MAINTENANCE OF THE GENOME**

- 3.1 DNA structure
- 3.2 DNA topology
- 3.3 RNA structure

**UNIT 4: CHROMOSOMES & NUCLEOSOMES**

- 4.1 Euchromatin and Heterochromatin
- 4.2 Banding Patterns in chromosomes
- 4.3 Lampbrush & Polytene chromosomes
- 4.4 Nucleosome-subunit of all chromatin
- 4.5 Structure of Nucleosomes

**REFERENCES:**

- 1. Lewin, B. Genes IX (2008), Jones and Barlett Publishers.
- 2. Watson, J. Molecular Biology of the Gene 5<sup>th</sup> Edition (2007), Pearson Education.

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**Syllabus: Semester-II**

**Practical Core 1: BTP 02: Biotechnology**

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1. Estimation of reducing sugar by Cole's method.
2. Estimation of Protein by Folin-lowry's method.
3. Quantitative estimation of amino-acids by Ninhydrin method.
4. Determination of acid value of fats and oils by titration with KOH.
5. Identification of eye colour in *Drosophila*.
6. Contribution of scientists in the field of genetics.
7. Study of Permanent slides/Photographs of banding techniques.
8. Problems related to Mendelian genetics.

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