

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

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

**Semester-I**

[Academic Year of Implementation: 2018-2019]

**Core 1: Biotechnology**

Course 1: BT-01: Introduction to Biotechnology

Course 2: BT-02: Cell Biology

**Practical Core 1: BTP-01: Biotechnology Practical**

**VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT**  
**B. Sc. Biotechnology Semester-I**

**BT-01: INTRODUCTION TO BIOTECHNOLOGY**

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**UNIT-1: UNDERSTANDING BIOTECHNOLOGY:**

- 1.1 What is Biotechnology?
- 1.2 Biotechnology-an interdisciplinary pursuit
- 1.3 Biotechnology- a three-component central core
- 1.4 Product safety
- 1.5 Public perception of Biotechnology
- 1.6 Biotechnology and developing world

**UNIT-2: SCOPE OF BIOTECHNOLOGY-I:**

- 2.1 Recombinant DNA and genetic engineering
- 2.2 Mammalian cell culture
- 2.3 Plants and plant cell culture
- 2.4 Bio-fuels
- 2.5 Bio-catalysis
- 2.6 Waste Water and Sewage treatment

**UNIT-3: SCOPE OF BIOTECHNOLOGY-II:**

- 3.1 Fermentation
- 3.2 Bio-fertilizer
- 3.3 Bio-pesticides
- 3.4 Vaccines
- 3.5 Monoclonal antibodies
- 3.6 Diagnostics in developing countries

**UNIT-4: BIOTECHNOLOGY IN INDIA:**

- 4.1 Introduction to DBT
- 4.2 Autonomous institutions of DBT
- 4.3 Public sector undertakings of DBT
- 4.4 BTIS-NET
- 4.5 Introduction to ABLE
- 4.6 Biotechnology- Current status of industrial growth in India

**REFERENCES:**

- 1. Ratledge, C. & Kristiansen, B. (2006) *Basic Biotechnology*, Cambridge University Press.
- 2. Gupta, P. K. (2005) *Elements of Biotechnology*, Rastogi Publications.

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**B. Sc. Biotechnology Semester-I**

**BT-02: CELL BIOLOGY**

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**UNIT-1: FUNDAMENTALS OF CELL:**

- 1.1 Discovery of cells
- 1.2 Basic properties of cells
- 1.3 Fundamental classes of cells: (Ultra structure and functions)
  - 1.3.1 Prokaryotic cell
  - 1.3.2 Eukaryotic cells (Plant and Animal)
- 1.4 Viruses

**UNIT-2: CELLULAR MEMBRANES: STRUCTURE**

- 2.1 Brief history of studies on plasma membrane structure
- 2.2 Chemical composition of membranes
- 2.3 Structure and functions of membrane proteins
- 2.4 Membrane lipids & membrane fluidity

**UNIT-3: CELLULAR MEMBRANES: FUNCTIONS**

- 3.1 An overview of membrane functions
- 3.2 Dynamic nature of plasma membrane
- 3.3 Movement of substances across cell membrane
- 3.4 Membrane potentials & nerve impulses

**UNIT-4: CELL CYCLE, MITOSIS AND MEIOSIS:**

- 4.1 **The Cell Cycle:**
  - 4.1.1 Cell cycle *in vivo*
  - 4.1.2 Control of cell cycle
- 4.2 **M Phase: Mitosis & Cytokinesis:**
  - 4.2.1 Prophase
  - 4.2.2 Pro-metaphase
  - 4.2.3 Metaphase
  - 4.2.4 Anaphase
  - 4.2.5 Telophase
  - 4.2.6 Forces required for mitotic movements
  - 4.2.7 Cytokinesis
- 4.3 **Meiosis:**
  - 4.3.1 The stages of meiosis
  - 4.3.2 Genetic recombination during meiosis

**REFERENCES:**

1. Karp, G. (2014) *Cell Biology*, 7<sup>th</sup> Edition, International Student Version, Wiley.
2. Willey, J. M., Sherwood, L. M. & Woolverton, C. J. (2017) *Prescott, Harley & Klein's Microbiology*, 10<sup>th</sup> Edition, The McGraw-Hill Companies, Inc.

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# **VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT**

## **B. Sc. Biotechnology Semester-I**

### **BTP-01: Biotechnology Practical**

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1. Principle, working and uses of laboratory instruments:  
[Microscope, Incubator, pH meter, Centrifuge, Colony counter]
2. Principle, working and uses of various types of sterilizers:  
[Hot air oven, Steam sterilizer, Inspissator, Bacteriological filters]
3. Introduction to Bioprocess, Animal Cell Culture and Plant Tissue Culture laboratories
4. General laboratory safety and instructions
5. Preparation and sterilization of glassware's and media, disposals of media and cultures
6. DNA staining by Schiff's reagent using onion peel
7. Study of various stages of meiosis using permanent slides
8. Study of various stages of mitotic cell division using onion root tips
9. Barr body from buccal smear
10. Geimsa staining of Blood cells

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