



# Dr. Bhimrao Ambedkar University Agra

Department of Biotechnology  
School of Life Sciences, Khandari Campus

## Value Added Courses

Course Name	Biotechnology for Society
Course Code	BT-VAC-01
Duration & Credit	30 Hrs. & 2 Credits
Coordinator	Dr. Monika Asthana, Assistant professor
Evaluation	By the Coordinator
Organized by	Department of Biotechnology, School of Life Sciences, Khandari campus, Agra

### Course Objectives

To understand the basic concepts and branches of Biotechnology and genetically modified organisms

#### UNIT I

Brief introduction of Biotechnology  
Differences in old and modern Biotechnology

#### UNIT II

Basic steps of Recombinant DNA technology  
Genetically modified organisms  
Clone organisms

#### UNIT III

##### Colours of Biotechnology and their applications

Blue Biotechnology - Marine  
Green Biotechnology - Agriculture  
Red Biotechnology - Medical  
White Biotechnology - Industrial  
Gold Biotechnology - Bioinformatics  
Grey Biotechnology - Conservation and Restoration of Environment  
Yellow Biotechnology - Nutrient  
Violet Biotechnology - IPR  
Brown Biotechnology - Current Environmental Challenges Facing Arid and Desert soils

**Books:** B. D Singh (2016). Biotechnology. Kalyani Publishers, India  
P.K. Gupta (2019). Biotechnology and Immunology. Rastogi Publication  
P K Gupta (2020). Molecular Biology And Genetic Engineering, Rastogi Publication

### Course Outcomes (COs)

This course provides knowledge of Biotechnology uses for society and mankind. At the end of this course student get benefited as following-

- CO1: Get knowledge about Biotechnology and manipulation of genes
- CO2: Understand the genetically modified organisms
- CO3: Learn about different branches of biotechnology in human society

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Dr. Bhimrao Ambedkar University, Agra



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## Value Added Courses

Course Name	Protein Engineering
Course Code	BT-VAC-02
Duration & Credit	30 Hrs. & 2 Credits
Coordinator	Dr. Monika Asthana, Assistant professor
Evaluation	By the Coordinator
Organized by	Department of Biotechnology, SLS, Dr. Bhimrao Ambedkar University Agra

### Course objectives:

After successful completion of the course student will learn the basic techniques and principles of proteins isolation, separation and purification.

### Syllabus

#### UNIT I

An overview of protein isolation: Properties of proteins, the conceptual basis of protein isolation. Protein purification table.

#### UNIT II

**Extraction and sub-cellular fractionation:** Phenol extraction methods, TCA/Acetone precipitation, Ammonium sulphate precipitation, centrifugal sub-cellular fractionation.

**Concentration of the extract and Quantification:** Freeze drying, dialysis, ultrafiltration, concentration/fractionation by salting out, fractional precipitation with polyethylene glycol, protein quantification- Lowry's method, Bradford assay.

#### UNIT III

**Electrophoresis techniques and blotting:** Principles of electrophoresis, the effect of the buffer, electroendosmosis, SDS polyacrylamide gel electrophoresis (SDS-PAGE), Two-dimensional gel electrophoresis (2D-PAGE), Isoelectric focusing, Blotting technique-Western Blotting.

#### TEXT BOOKS:

1. A guide to protein isolation, Clive Dennison, kluwer academic publishers new york, boston, dordrecht, london, Moscow, 2002.
2. Protein Purification Applications, S.L.V. Harris and Angal IRL Press, (1990).
3. Membrane Protein Purification and Crystallization, Carola Hunte, Gebhard von Jagow and Hermann Schagger, Academic Press (2011).
4. Creighton TE, Chasman DI (1997) Protein structure: a practical approach; IRL press Oxford
5. Branden and Tooze (1999) Introduction to Protein Structure (2nd Edition) Garland Publishing
6. Protein Purification: Principles and Practice (Springer Advanced Texts in Chemistry) by Robert K. Scope (1983)
7. Protein Purification Techniques: A Practical Approach (Practical Approach Series) by Simon Roe (2001)

#### Course Outcomes (Cos):

On completion of this course, students will able to:

- CO1: Learn about isolation of protein.
- CO2: Learn about extraction and quantification of proteins
- CO3: Knowledge of separation and purification of proteins.

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## Value Added Courses

Course Name	Pharmaceutical Biotechnology
Course Code	BT-VAC -03
Duration & Credit	30 Hrs. & 2 Credits
Coordinator	Dr. Monika Asthana, Assistant professor
Evaluation	By the Coordinator
Organized by	Department of Biotechnology, SLS, Dr. Bhimrao Ambedkar University Agra

### Course objectives:

After successful completion of the course student will learn the basic principles of health management strategies; Student will also learn the various types of vaccine preparation methods and the essential principles in their health management

## Syllabus

### UNIT 1

Pharmacology: Terms and Definitions;  
Drugs, chemicals, antibiotics and probiotics and their mode of action;  
Preventive strategies; Quarantine and health certification

### UNIT 2

Principles and methods of vaccine production and immunization;  
DNA and RNA vaccines;  
Immunostimulants

### UNIT 3

Bioremediation strategies for health management.  
Probiotics; Bioremediators and Other prophylactic measures

### TEXT BOOK:

1. A Textbook of Clinical Pharmacology and Therapeutics by Ritter et al., Hodder Arnold, Hachette Livre UK

### Course Outcomes (Cos):

On completion of this course, students will able to:

- CO1: Learn about the terminology of pharmacology and identification of medicinal molecules.  
CO2: Learn about Vaccine preparation  
CO3: Progress in enduring health management strategies.

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