

DEPARTMENT OF BIOTECHNOLOGY

FOOD PROCESSING & PRESERVATION

**SYLLABUS
FOR
VALUE ADDED COURSE
(UG LEVEL)**

FOOD PROCESSING & PRESERVATION



RAMA DEVI WOMEN'S UNIVERSITY

Vidya Vihar, Bhubaneswar-751022

Syad
HEAD
P.G. Dept. of Biotechnology
Rama Devi Women's University,
Bhubaneswar

Mohanty

Mohanty
Controller of Examinations
R.D. Women's University
Bhubaneswar

FOOD PROCESSING & PRESERVATION

Course Outcomes:

The student will be able to

CO1: Understand the basic principles involved in food preservation.

CO 2: understand the various processing methods.

CO 3: Comprehend suitable techniques for preservation of various foods.

CO 4: apply the modern technologies of food preservation in industry.

CO 5: evaluate and suggest proper preservation methods and equipment.

Module-I

Basics of food preservation: Fundamentals of Food Preservation, Concept, Definition and scope of food preservation, general principles of food preservation

Module-II

Food microbiology: Microorganisms in food- Introduction, types of microorganisms, conditions for growth, food spoilage & their control

Module-III

Food preservation methods: Preservation of food by using preservatives- Concept and definition, Types: Natural and Synthetic preservatives; Drying, Irradiation, low temperature, Modern techniques- Concept and application.

Books:

1. Sivasankar B (2002) Food processing and preservation. Prentice Hall India Learning Private Limited.
2. NIIR Board of Consultants & Engineers (2019). The Complete Technology Book on Processing, Dehydration, Canning, Preservation of Fruits & Vegetables (Processed Food Industries) 4th Revised Edition. NIIR project consultancy services.
3. DS Warris (2020). Food Processing and Preservation. CBS

DEPARTMENT OF BIOTECHNOLOGY

SYLLABUS
FOR
VALUE ADDED COURSE
(UG LEVEL)
PROTEIN ENGINEERING



RAMA DEVI WOMEN'S UNIVERSITY

Vidya Vihar, Bhubaneswar-751022

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PROTEIN ENGINEERING

Course Outcomes:

- CO 1:** The objective of the course is to provide a theoretical and practical introduction into various proteomics techniques.
- CO 2:** Students will be trained in working with proteomics laboratory equipment.
- CO 3:** Students will be emphasized on planning, presentation and critical evaluation of laboratory results.
- CO 4:** Students can independently handle basic equipment related to protein engineering.
- CO 5:** Students will be trained in protein extraction and estimation.

Module-I

Over view of Protein: Three-dimensional structure, Properties of Protein,

Concepts of Protein isolation and purification: Methods of Protein isolation, Purification techniques

Module-II

Extraction of Protein: Methods of Protein extraction (Phenol extraction method, Ammonium sulphate/TCA/Acetone precipitation method)

Protein quantification method: Lowry method, Bradford method, Mechanism, Application, and limitations

Module-III

Proteomics technologies: SDS polyacrylamide gel electrophoresis (SDS-PAGE). 2D-PAGE, Iso electric focussing Gel, Mass spectrometry

Protein sequencing: N-terminal sequencing- Sanger's method, Edman degradation; C-terminal sequencing

Books:

1. Analysis of Genes and Genome. R J Reese. Wiley Publications.
2. Bioinformatics and Functional Genomics- J Pevsner. Wiley Blackwell Publications.
3. Liebler, D. C. (2002). Introduction to Proteomics: Tools for the New Biology. Totowa, NJ: Humana Press.
4. Campbell, A. M., & Heyer, L. J. (2003). Discovering Genomics, Proteomics, and Bioinformatics. San Francisco: Benjamin Cummings.

DEPARTMENT OF BIOTECHNOLOGY

**SYLLABUS
FOR
VALUE ADDED COURSE
(PG LEVEL)**

**MOLECULAR TECHNIQUES FOR
INTEGRATIVE RESEARCH**



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MOLECULAR TECHNIQUES FOR INTEGRATIVE RESEARCH

Course description:

The course is designed to help master level students from different domains (botany/zoology/biotechnology/genomics/physics/chemistry) to learn about different types of molecular techniques as required for Trans-disciplinary research. This course will make the students familiar with the techniques employed in molecular biology, experiments involved using different techniques and the use of instruments in these techniques.

Course objectives:

CO 1: The objective of the course is to provide a theoretical and practical introduction into various molecular techniques.

CO 2: Students will be trained in working with molecular laboratory equipment and biological solutions for molecular research.

CO 3: Students will be emphasized on planning, presentation and critical evaluation of laboratory results.

CO 4: Students can independently handle basic molecular equipment.

CO 5: They can use web-based data resources for bio molecular analyses

MODULE 1:

Bioanalytics- Chromatographic & Spectroscopic techniques (3 hours)

Practical demonstration on chromatography and UV-Vis spectroscopy (3 hours)

Microscopic techniques- SEM, TEM, AFM & Confocal microscopy (3 hours)

Practical demonstration on phase-contrast & inverted microscopy (3 hours)

MODULE 2:

Biochemical techniques: Biomolecules estimation methods, protein purification assays, protein sequencing (3 hours)

Practical demonstration on protein estimation & purification (3 hours)

Immunological Techniques: Immunoelectrophoresis, Immunodiffusion, Double Diffusion, Western blotting (3 Hours)

Practical demonstration on Elisa & Immuno-blotting system (3 Hours)

Nano Techniques: Nanoparticles as biosensors, nanomedicine in therapeutics, nanomaterials for tissue engineering (3 Hours)

Practical demonstration on preparation of nanoparticles (3 hours)

MODULE 3:

Recombinant-DNA Techniques: Isolation of DNA & RNA, Electrophoresis & PCR, gene cloning, bacterial transformation (3 hours)

Practical demonstration on isolation of DNA/RNA, PCR and gene cloning (3 Hours)

Bioinformatics: DNA Sequencing, tools for DNA sequence assembly, gene prediction and functional annotation (3 Hours)

Practical demonstration on application of tools for identification, characterization and functional annotation of gene(s) & proteins (3 Hours)