Syllabus

For

M.Phil. Course (Biotechnology)

Session: 2020-2021

P.G. Department of Biotechnology
Utkal University
Bhubaneswar, Odisha

Outline of MPhil Course Curriculum
P.G. Department of Biotechnology
Utkal University

Semester-I			
Sl No	Paper	Subject	Marks
1	I	Research Methodology	100
2	II	Tools and Techniques in Biotechnology	100
3	III	Lab work Based on Theory Paper- I & II	100
Semester-II			
4	IV	Project Work	100
5	V	Review Writing/ Manuscript writing and Seminar Presentation	100
6	VI	Seminar Presentation on Project work	100
		Total	600

Paper-I: Research Methodology

UNIT-I

Research: Definition, Importance & Meaning of research, Characteristics of research, Types of Research, Steps in research, identification, selection and formulation of research problem, Research question- research design-formulation of hypo dissertation, review of literature.

UNIT-II

Sampling technique: sampling theory, type of sampling-steps in sampling-sampling and non-sampling error-sample size-advantage and limitation of sampling.

Collection of data: Primary data-meaning-data collection methods-secondary data-meaning relevance, limitation and cautions.

UNIT-III

Statistics in research-measure of central tendency, dispersion, skewness and kurtosis in research, hypo dissertation, fundamentals of hypo dissertation testing, standard error, important non parametric tests: testing of significance, mean, proportions, variance and correlation, testing for significance of difference between mean, proportions, variances and correlation co-efficient. Chi-square test, ANOVA, one way and two way.

UNIT-IV

Research report: type of reports, contents, styles of reporting, steps in drafting report, editing the final draft, evaluating the final draft.

UNIT-V

Introduction to bioinformatics, elementary idea about data base management system e.g., Gene bank, EMBL, Swiss port, sequence database like FASTA, BLAST, algorithm and bioinformatics tools. Pair wise sequence alignment, Multiple sequence alignment, gene prediction and protein structure prediction.

Paper-II: Tools and Techniques in Biotechnology

UNIT-I (Instrumentation)

1. Principle and application of Spectrophotometer
2. Principle and application of Chromatography, GC-MS
3. Principle and application of Electrophoresis
4. Principle and application of PCR

UNIT-II (Techniques in Biotechnology)

1. Isolation and purification of DNA

2. Isolation and purification of RNA
3. Isolation and purification of Proteins
4. Commonly used vectors for gene cloning, DNA manipulating enzymes, construction of genomic and cDNA libraries.

UNIT-III (Microbial Technology)

1. Bioreactors: Structure, types and applications
2. Microorganism in Bioprocess engineering
3. Industrial products and microbes with special reference to alcohol, acids, antibiotics
4. Food processing, Bioleaching and Biosensor

UNIT-IV (Immunotechnology)

1. Antigen-Antibody interaction their application in immunodiagnostics
2. Detection of antigen/protein by western blotting
3. Antigen based biosensor ELISA and CHIP
4. FACS and its use in cell culture

UNIT-V (Environmental Biotechnology)

1. Environmental Biotechnology : Utilization of various microorganisms for pollution control
2. Pollution: Definition, effects, causes and control
3. Xenobiotics
4. Bioremediation

Paper-III

Lab course based on theory papers I and II

Paper-IV

Project Work

Paper-V

Review Writing/ Manuscript writing and Seminar Presentation

Paper-VI

Seminar Presentation on Project Work