Course Code	Course Name	Credits
26BT555	BASIC RESEARCH METHODOLOGY IN BIOTECHNOLOGY	04

Course Objectives

- To develop Research Aptitude, Logical Thinking and Reasoning
- To understand basic principles of Research Methodology and identify a Research Problem
- To understand a general definition of Research Design
- Understand the fundamental principles, types, and steps involved in scientific research.
- To identify, define, and formulate research problems

Learning Outcomes

Upon successful completion of this course, it is intended that a student will be able to:

- Demonstrate knowledge of research processes (reading, evaluating, and developing).
- Perform literature reviews using print and online databases. identify, explain, compare, and prepare the key elements of a research proposal
- Understand basic principles of research methodology and identify a research problem.
- Identify the overall process of designing a research study from its inception to its report.
- Ability to select the most appropriate methodology to solve specific biotechnological problems.

Unit 1 - Introduction to Research Methodology (12 Hrs.)

Meaning of Research, Objectives of Research, Motivations in Research, types of Research, Research Approaches, Significance of Research, Research Methods and Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research

Unit 2 - Defining the Research Problem (12 Hrs.)

Concept and need, Identification of Research problem, defining and delimiting Research problem..

Unit 3 - Research Questions and Hypothesis (12 Hrs.)

Variables and their linkages, characteristics of good Hypothesis. Research question and formulation of hypotheses-directional and non-directional hypotheses, Basis for hypotheses.

Unit 4 - Research design (12 Hrs.)

Meaning, Need, Features of Good Design, Concepts, Types. Basic principles of Experimental Design, various methods of Research. Survey, Philosophical, Historical, Experimental, Causal Comparative, Genetic, Case Studies..

Unit 5 - Tools for Data Collection (12 Hrs.)

Collections of Primary Data, Secondary Data, Selection of appropriate method for data collection, Techniques of developing research tools.

Reference Books:

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K. An introduction to Research Methodology, RBSA Publishers.2002.
2. Kothari, C.R. Research Methodology: Methods and Techniques. New Age International. 1990.
3. Sinha, S.C. and Dhiman, A.K. Research Methodology, EssEss Publications. 2 volumes, 2002.
4. Trochim, W.M.K. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.2005.
5. Wadehra, B.L. Law relating to patents, trademarks, copyright designs and geographical indications. Universal Law Publishing.2000.