

SEMESTER-VIII

BTC DSC 451T RESEARCH METHODOLOGY

Contact Hours: 45

Full Marks = 100 [ESE (70) CCA (30)]

Course Objectives: This biotechnology research methodology course is designed to equip students with the essential skills and knowledge required to conduct research effectively in the field of biotechnology. Students will develop a solid foundation in research concepts, including different research types, data collection techniques, and research design. They will also gain practical laboratory skills, learn to handle chemicals safely, and understand the importance of safety protocols. Furthermore, the course will focus on data interpretation and reporting, enabling students to communicate research findings through technical reports, popular reports, and oral presentations.

UNIT 1

(10 Lectures)

Introduction to research methodology: meaning of research; types of research (descriptive vs analytical; applied vs fundamental; quantitative vs qualitative; conceptual vs empirical); research methods versus methodology; research process; library research; field research; laboratory research; criteria of good research; problems encountered by researchers in India.

UNIT 2

(10 Lectures)

General laboratory practices: common calculations in biotechnology laboratories; understanding the details on the label of reagent bottles; molarity and normality of common acids and bases; preparation of solutions; molar, molal and normal solutions; technique of handling micropipettes; knowledge about common toxic chemicals; safety measures in handling common toxic chemicals.

UNIT 3

(9 Lectures)

Methods of Data collection: concept of primary and secondary data; collection of primary data; observation method; collection of data through questionnaires; collection of data through schedules; difference between questionnaires and schedules; collection of secondary data; case study method- meaning, characteristics, advantages and limitations.

UNIT 4

(9 Lectures)

Research design and sampling: meaning of research design; need for research design; features of a good design; different research designs; important concepts relating to research design; randomized block design; steps in sampling design; probability sampling; systemic sampling; stratified sampling; cluster sampling; characteristics of a good sample design.

UNIT 5

(7 Lectures)

Interpretation and report writing: meaning of interpretation; technique of interpretation; precautions in interpretation; significance of report writing; different steps in writing a report; layout of the research report; technical report; popular report; oral presentation.

Course Outcomes: Upon completing this course, students will have the capability to apply research methodology principles to biotechnology research effectively. Students will gain knowledge on various data collection techniques, including observation, questionnaires, and case studies, enabling them to gather primary and secondary data for research purposes. They will be proficient in laboratory practices, ensuring safety when working with common chemicals used in biotechnology laboratories. Additionally, they will understand different research designs and sampling methods, enabling them to select the most suitable approach for their research. Furthermore, students will be adept at interpreting research findings accurately and conveying results through well-structured research reports and engaging oral presentations. These skills will empower students to contribute to the advancement of biotechnology through research and innovation.

SUGGESTED READING

1. Kothari, C. R. (2004). Research Methodology: Methods and Techniques. India: New Age International (P) Limited.
2. Panneerselvam, R. (2014). Research Methodology. India: PHI Learning.
3. Kumar, A. (2002). Research Methodology in Social Science. India: Sarup & Sons.
4. Mukherjee, S. P. (2019). A Guide to Research Methodology: An Overview of Research Problems, Tasks and Methods. United States: CRC Press.
5. Krishnaswamy, K. N. (2011). Management Research Methodology: Integration of Principles, Methods and Techniques (For VTU). India: Pearson Education India.