VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
M.Sc. MICROBIOLOGY SEM III

ELECTIVE 1
MB 3004 A: RESEARCH METHODOLOGY AND BIOSTATISTICS

1. Course Code & Title

Course code:	Core Elective 1 (MB 3004)
Course title:	Research methodology and biostatistics
Course type:	Core
Course credits:	04

2. Course overview and Course Objectives

The learning objective of the paper will enrich the students with the basic principle of research methodology which help the students to learn essential steps involved in research. It also increases the understanding in use of biostatistics in analysis and interpretation of data.

Course Objectives

- To study the research fundamentals
- To learn about formulating a research problem, research design, and preparation of research report.
- To gain an insight of collecting data and presentation of scientific data.
- To understand the bio statistical tools and techniques for conducting research

3. Course Content

UNIT 1	RESEARCH & ITS TYPES
	Teaching Duration: Lectures 15
1.1	Meaning and objective of Research.
1.2	Motivation in research.
1.3	Criteria of good research.
1.4	Problems encountered by researchers in India.
1.5	Types of research.
1.6	Reviewing the literature for research purpose.

UNIT 2	RESEARCH METHODOLOGY
	Teaching Duration: Lectures 15
2.1	Constructing hypothesis.
2.2	Research design.
2.3	Defining a research problem.
2.4	Contents of research proposal.
2.5	Research report.
	2.5.1 Research report- Tables.
	2.5.2 Research report- Figures.
	2.5.3 Research report- Formatting & Typing.

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UNIT 3	FUNDAMENTALS OF BIOSTATISTICS
	Teaching Duration: Lectures 15
3.1	Introduction to Biostatistics 3.1.1 Definition, development & application of Biostatistics 3.1.2 Role of Biostatistics 3.1.3 Data collection and treatment.
3.2	Preliminary Concepts.
3.3	Diagrammatic representation of data.
3.4	Graphical representation of data.
3.5	Frequency Distribution.

UNIT 4	METHODS OF DATA ANALYSIS
	Teaching Duration: Lectures 15
4.1	Measures of Central Tendency. 4.1.1 Arithmetic mean. 4.1.2 Median. 4.1.3 Mode. 4.1.4 Geometric mean. 4.1.5 Harmonic mean. 4.1.6 Illustrative problems.
4.2	Student t-test Student t-test. 4.2.1 Introduction. 4.2.2 Student's t-Distribution. 4.2.3 Application of t-Distribution.
4.3	Analysis of Variance (ANOVA). 4.3.1. Principle of Anova.

4. Course Learning Outcomes/Student's Learning Outcomes (SLO)

Unit 1: Students shall understand fundamentals of research and its types

Unit 2: Students shall gain knowledge of research methodology

Unit 3: Students will gain an understanding the presentation of statistical data and its analysis.

Unit 4: Students shall develop an understanding of the bio statistical tools for data analysis.

Recommended learning resources

- Arora P. N. (2017) Biostatistics, Himalaya Publishing House. (ISBN: 978-93-5142-823-7)
- Gurumani N. (2011) Research Methodology for Biological Sciences, MJP Publishers, Chennai. (ISBN: 978-81-8094-016-0)
- Gurumani N. (2010) An Introduction to Biostatistics, MJP Publishers, Chennai, Revised 2nd Edition. (ISBN: 978-81-8094-006-4)
- Khan I.A. and Khanum A. (2009) Fundamentals of Biostatistics, Ukaaz Publications, Hyderabad. Revised 5th Edition. (ISBN: 978-81-9004-410-3)
- Ranjit Kumar. (2011) Research Methodology-A step by step Guide for Beginners. Sage Publications.3rd Edition. (ISBN: 978-1-84920-301-2)

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➢ C. R. Kothari and Gaurav Garg (2004) Research Methodology Methods and Techniques, Newage International Publication, 2nd Revised Edition (ISBN: 978-81-224-2488-1).

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