

## RESEARCH METHODOLOGY AND BIOSTATISTICS

Sem	Subject Code	Category	Lecture		Theory		Practicals	Credits
III	19CPFN3C	Core paper IX	Hrs/sem	Hrs/Per week	Hrs/sem	Hrs/Per week	-----	4
			90	6	90	6		

### COURSE OBJECTIVE:

- 1) To understand the significance of statistics and research methodology in research.
- 2) To understand the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.
- 3) To apply the appropriate statistical technique for the measurement scale and design.

### COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Introducing the basic methods of Research Methods	K2
CO2	To learn how to write a research proposal and review literature	K2, K3
CO3	Learning about sampling and data representation	K2, K3
CO4	Understanding the importance Biostatistics in Research	K2, K3, K4
CO5	To understand how ethics are important in research	K1, K2, K3

Knowledge level: K1 – Remember, K2-Understand, K3- Apply, K4-Analyse.

### MAPPING WITH PO

COS	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	M	M
CO2	M	M	S	S	S
CO3	M	M	S	M	S
CO4	M	M	S	M	S
CO5	M	M	S	M	M

S-Strong; M-Medium, L- Low

## **UNIT I**

**18 Hours**

### **INTRODUCTION TO RESEARCH METHODOLOGY**

- A) Research- Meaning, purpose, approaches and Types of Research.
- B) Research Designs –Experimental and Observational; Quantitative and Qualitative approaches.
- C) The Research Process - Defining the problem; research questions; objectives. Concepts of Hypothesis - Null, Alternative Hypothesis, Type I and type II errors.

## **UNIT II**

**18 Hours**

### **PROPOSAL WRITING AND LITERATURE REVIEW**

- A) Framing Proposal for acquiring grants: The question to be addressed – Rationale and importance of the question being addressed – Empirical and theoretical framework – Presenting pilot study / data or background information - Research proposal and time frame – Specificity of methodology – Organization of different phases of study – Expected outcome of study and its implications – Budgeting - Available infrastructure and resources - Executive summary
- B) Review of related literature and originality in writing; Citation formats: in medical sciences, social sciences; Issues of academic fraud and plagiarism, conflicts of interest, authorship and publication

## **UNIT III**

**18 Hours**

### **SAMPLING AND DATA REPRESENTATION**

- A) Sampling & Tools - Role of sampling in research; Types of sampling; Research Tools and Techniques Validity and reliability; Interviewing and observational methods
- B) Representation of Data - Graphical and Diagrammatic Presentation of Data (Bar diagrams, Pie-diagram, Histogram, Frequency Polygon, Smoothed frequency curve and Ogives). Tabulation and Classification. Frequency Distribution.

## **UNIT IV**

**18 Hours**

### **BIOSTATISTICS ANALYSIS**

- A) Introduction to Bio statistics – Meaning and its scope; Parameter and Statistics; types of statistical data; Measures of central tendencies – Mean, Median and Mode: Measures of dispersion – Range, Quartile deviation, standard deviation, Skewness and Kurtosis; Probability – Definition, Axioms of Probability; Addition and Multiplication theorem.
- B) Elementary Probability Theory – Addition and Multiplication – Bayes Theorem – Random Variables and Probability distribution- Binomial, Poisson, and Normal. Study of relationship between variables – correlation: Simple, Partial, Multiple Correlation (three variables); Regression – Simple, Multiple (three Variables). Measures of association – Chi square test for goodness of fit & contingency table.

- C) Sampling Distribution Standard error t & F distribution: t test based on single samples, two sample mean, paired samples, F test two sample variances, F test for several mean (One way ANOVA only). Z-test for proportion – One sample, two sample; Computer Applications Software - MS EXCEL – SPSS in Data Analysis

## UNIT V

**18 Hours**

### ETHICS IN RESEARCH

Ethics and Politics of Research - Identify, define, and analyze ethical issues in the context of human subject research. Reasons for conducting ethical review of research, theories and concepts related to ethical decision-making including consequentialism, deontology, respect, dignity, discourse ethics, communitarianism, liberalism and the four principles approach. Ethical importance of consent, privacy and confidentiality in research.

**Distribution of Marks:** Theory – 25 (IA) + 75 (univ. exam) = 100 Marks

### TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Kothari C R	Research Methodology: Methods and Techniques (2nd ed.)	New Age International Publishers, New Delhi, India. Ltd., Ramnagar, Delhi.	2008
2	Copper, H.M.	Intergratingresearch : A guide for literature reviews (2nd Edition)	Sage Publications, California	2002
3	Harman, E & Montages, I.	The thesis and the book	New Delhi :Vistar.	2007
4	Argyrous, G	Statistics for Social and Health Research	London: Sage	2000
5	Bernard, H.R.	Social Research Methods: Qualitative and Quantitative Approaches	Thousand Oaks, Ca: Sage	2000
6	Mujis, D.	Doing Quantitative Research in Education with SPSS.	London: Sage	2004

### REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Agrawal C. , Joshi S.P. and Sinha A	Communication Research and development, The ISRO Experience, new Delhi	Nawray Rai concept Pub. Co.	

2	Bhattacharya DK	Research Methodology	Anurag Jain for excel books, New Delhi, India	2004
3	Fowler FJ	Survey Research Methods (3rd ed.)	Sage Publications, Newbury Park	2001
4	Patton Q.M	Qualitative evaluation and Research methods	sage Pub.,	1990
5	Ratnapala N	New Horizons in Research methodology	Sri Lanka	1993
6	Stranss, A and Corbin, J.	Basis of Qualitative Research: Grounded Theory Procedures and Techniques	Sage Publications, California	1990
7	Gupta S.C. and Kapodi V.R.	Fundamentals of Applied Statistics	New Publications Ltd.	1990
8	Bandarkar, P.L. and Wilkinson T.S.	Methodology and Techniques of Social Research	Himalaya Publishing House, Mumbai	2000

#### WEB SOURCES:

1. Sample Size Calculator - <https://www.calculator.net/sample-sizecalculator.html?type=1&cl=99.999&ci=5&pp=20&ps=1000&x=80&y=14>
2. <https://www.surveymonkey.com/mp/sample-size-calculator/>
3. Sample Error Calculator - <https://www.dssresearch.com/resources/calculators/sample-error-calculator/>
4. <https://www.youtube.com/channel/UCHpq07udPyomX9EpMkvjKqg/about>

#### TEACHING METHODOLOGY

- Chalk and board teaching
- Study Assignment method
- Active learning method
- Group discussions
- PPT
- Seminars
- Other Group activity

#### SYLLABUS DESIGNER:

- Ms. R. TAMILSELVI, Head and Assistant Professor, Department of Foods and Nutrition