University of Mysore

DOS in Food Science and Nutrition, Manasagangotri, Mysore

PH.D. COURSE WORK IN FOOD SCIENCE AND NUTRITION

SYLLABUS FOR ADVANCED RESEARCH METHODOLOGY

UNIT 1

a. **Research Methodology:** Meaning and Objectives of research; Types of research [Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, Field setting vs. laboratory, clinical vs. diagnostic, Exploratory vs. Formalized]; Research Approaches [Qualitative approach and Quantitative approach] Significance of research; Basic concepts about research and scientific method; Research process.
b. **Defining the Research problem**: Meaning of research problem; Selecting the research problem; Techniques involved in Defining problem.
c. **Research Designs:** Meaning, need, features of a good design, concepts relating to research design, Different research designs – Exploratory research studies, descriptive and diagnostic research studies, Longitudinal, cross-sectional and sequential studies; Hypothesis-testing research studies; Basic principles of Experimental designs; Important experimental designs; Evaluation and Interventional designs.

UNIT 2

a. **Sampling Design:** Steps in sample design; criteria of selecting a sampling procedure; Characteristics of a good sampling design; Types of sample designs [Non-probability sampling and Probability sampling]; Complex Random Sampling Designs [Systematic sampling, Stratified sampling, Cluster sampling, Area sampling, Multi-stage sampling, Sequential sampling]**.**
b. **Measurement and Scaling Techniques:** Measurement in research, measuring scales, sources of error in measurement, test of sound measurement- validity, reliability, practicality; meaning of scaling, scale classification bases, important scaling techniques - rating scales, scale construction techniques-arbitrary scales, differential scales, likert-type scales, cumulative scales, factor scales, multidimenstional scaling.

UNIT 3

a. **Methods of Data Collection:** Collection of primary data in surveys and descriptive research - Observation, Interview, Questionnaire, schedules, Case study, and Collection of secondary data and characteristics to be noticed before using secondary data**.**
b. **Ethical Issues in Research:** Benefits of the Research, Responsibility, Rights of the Research Participant, Physical and Psychological Risks, Deception, Reducing Risk and/or Minimizing Harm, Informed Consent, Privacy, Summary of Results; Ethical Issues regarding Copyright.

UNIT 4

a. **Statistical Methods I: Probability and Inference -** Advanced theory, derivations of quantitative statistics. Descriptive statistics, probability, normal distribution. One-/two-sample hypothesis tests, confidence intervals. Chi square tests. One-way analysis of variance, follow up tests.

b. Statistical Methods II: Regression and the General Linear Model - Analysis of variance designs (two-/three-way), repeated measures, correlation, simple/multiple regression methods, non-parametric procedures, multivariate analyses.

c. Computer Application in Analysis of Data

UNIT 5

a. Interpretation: Meaning, Techniques and precautions in interpretation.

b. Scientific writing: Significance and steps in scientific writing, Review of literature, Authenticity of reviews, Layout of the research report writing, Types of Reports, Mechanics of writing a research report, Precautions for writing research reports**:** Writing the research articles and project proposal

UNIT 6

Research designs in Nutrition

A. Nutritional epidemiology
   i. Levels of epidemiologic research (primary, secondary and tertiary prevention)
   ii. Observational studies – cross-sectional, case-control, cohort (prospective, retrospective, time- series)
   iii. Types of analysis – eg., incidence rate, prevalence rate.

B. Experimental studies
   i. Pre-clinical studies - Laboratory based *in vitro* and animal studies
   ii. Clinical studies - Human intervention trials. Types - Randomized controlled trials (RCT), Non-randomized trial.

C. Ethical issues, Informed consent process, Regulations and Guidelines for research on human subjects

UNIT 7

Nutrition research - Data collection- Principles, definition and examples in nutrition research for the following.

A. Quantitative tools
   i. Direct parameters – Application of anthropometry, dietary survey, clinical, biochemical and growth monitoring tests, body composition tests and physical fitness tests.
   ii. Indirect parameters –vital statistics, population tests, socio –economic indices, KAP surveys.

B. Qualitative research tools- Types of interviews, Focus group discussions, Free listing and pile sorting, Narrative, Case studies, Participatory methods.

C. Integrating qualitative and quantitative methods.

D. Nutrition Intervention: Tools & techniques to facilitate nutrition intervention. Biomarkers and their use in nutrition intervention

UNIT 8

Research Techniques in Food Science and Nutrition

1. Analytical techniques for determination of food composition.
2. Techniques in sensory analysis.
3. Product development and consumer behavior.
4. Food behavior surveys.
