

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. RESEARCH METHODOLOGY

- 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. STATISTICAL METHODS

- a. Statistical Methods 1: (Concept only) - Review of basic statistics; Descriptive statistics. Normal distribution and its properties, Methods of correlation and regression (simple and multiple), Statistical Inference-testing of hypothesis, parametric tests-testing the significance between two means; independent two sample t-test and paired sample t-tests.
- b. Statistical Methods 2: (Concept only) - Analysis of Variance (ANOVA), Types, basic model, One way and Two way ANOVA, Need for post hoc tests, repeated measures ANOVA, Multivariate techniques: Principle component analysis, Discriminant analysis, Cluster analysis, Multivariate analysis of variance (MANOVA). Nonparametric tests; Consequences of failure of assumptions underlying parametric tests, Man-Whitney U tests, Kruskal-wallis test, Wilcoxon signed rank test, Friedman's test. Analysis of qualitative data; Chisquare test for independence, measures association-contingency coefficient and Cramer's, measures of agreement-Kappa coefficient.
- c. Computer application in analysis of data.

UNIT 3. SCIENTIFIC WRITING

- 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 4. 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 5. 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 6. Research Techniques in Food Science and Nutrition

- A. Analytical techniques for determination of food composition.
- B. Techniques in sensory analysis.
- C. Product development and consumer behavior.
- D. Food behavior surveys.

UNIT 7 PUBLIC HEALTH NUTRITION

- A. Global Nutrition Scenario- Determinants of Nutritional status, prevalence of deficiencies in different age groups, country wise comparison and differences
- B. Agricultural scenario- Global and National, demand and supply patterns, changes over time, impact on diet and nutrition. Food security, Nutritional security and public policy- India's status today
- C. National & International nutritional policies and programs, organizations/associations working in the area of Food science & Nutrition

UNIT 8 EMERGING TECHNOLOGIES FOR IMPROVING QUALITY & VALUE

- A. Processed foods
- B. Functional foods
- C. Genetically modified foods
- D. Nanotechnology

Principles, techniques, applications, food safety and their role in alleviation of malnutrition
