

# **Template For Programme Information(Doctoral)**

## **Syllabus for Ph.D Course work in Foods & Nutrition**

### **Paper-I**

#### **Research Methodology**

Total Marks: 100

Duration of Exam: 3 hrs

- The examiner will set ten questions, two from each unit. Students are required to attempt five questions selecting at least one question from each unit. All questions carry equal marks.

#### **Unit-1**

A. Research Methodology: Meaning 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.

#### **Unit-2**

A. 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.

B. Research designs in Nutrition

1. Nutritional epidemiology

a) Levels of epidemiologic research (primary, secondary and tertiary prevention)

b) Observational studies – cross-sectional, case-control, cohort (prospective, retrospective, time – series)

c) Types of analysis – incidence rate, prevalence rate.

2. Experimental studies

a) Pre-clinical studies – Laboratory based in vitro and animal studies

b) Clinical studies – Human intervention trials. Types – Randomized controlled trials (RCT), Non-randomized trial.

### **Unit-3**

- A. Sampling Design: Steps in sample design; criteria of selecting a sampling procedure; Characteristics of a good sampling design; Types of sample design; Non-probability sampling and probability sampling; Complex Random Sampling Design: 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.
- C. 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.

### **Unit-4**

- A. Method 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: Ethical issues. Informed consent process. Regulations and Guidelines for research on human subjects.
- C. Nutrition research – Data collection- Principles, definition and examples in nutrition research.
- D. Quantitative tools
- 1) Direct parameters – Application of anthropometry, dietary survey, clinical, biochemical and growth monitoring tests, body composition test and physical fitness tests
  - 2) Indirect parameters – vital statistics, population test, socio- economic indices. K.A.P surveys
- E. Nutrition Intervention: Tools & techniques to facilitate nutrition intervention. Biomarkers and their use in nutrition intervention.

### **Unit-5**

- A. Statistical Methods: Probability and Inference- Advanced theory, derivations of quantitative statistics. Descriptive statistics, probability, normal distribution. One-two-sample hypothesis test, confidence intervals. Chi square test. One-Way analysis of variance, follow up tests.
- B. Statistical Methods: Regression and the General Linear Model- Analysis of variance designs (Two/three-way), repeated measured, correlation, simple/multiple regression methods, non-parametric procedures, multivariate analysis.
- C. Computer Application in Analysis of Data.

- D. Interpretation: Meaning Techniques & Precautions in Interpretation.
- E. Scientific writing: Significance & Steps in Scientific Writing.  
Review of literature.  
Authenticity of reviewer. 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.

**Paper -II**  
**Food Toxicology**

Total Marks: 100  
Duration of Exam: 3 hrs

**Note:**

- All the questions carry equal marks.
- Eight questions, two questions from each unit (I, II, III & IV) will be set.
- The candidates are required to attempt five questions in all. Questions will be attempted by selecting at least one question from each unit.

**UNIT-I**

- 1. Introduction to food safety and Toxicology:** Hazards- Microbiological, Nutritional, Environmental, Natural Toxicants, Pesticide residues and Food Additives.
- 2. Assessment of Food Safety**
  - Risk assessment and risk benefit
  - Indices of human exposure
  - General design of toxicity assays
  - Acute toxicity
  - Mutagenicity and carcinogenicity
  - Reproductive and development toxicity
  - Neurotoxicity and behavioural effects
  - Immunotoxicity
  - Biotechnology and food safety
  - HACCP

**UNIT-II**

- 3. Evaluation Guidelines and Computer Modeling of Risk Assessment.**
- 4. Microbial Problems in Food Safety including Mycotoxins and viruses**

**UNIT-III**

- 5. International Direct Additives:** Preservatives, Nitrate and N-nitroso Compounds.

- 6. Indirect Additives, Residues and Contaminants:** Multi-contaminant studies. Anti-microbial and veterinary drugs, pesticides, polyhalogenated aromatic hydrocarbons, polycyclic aromatic hydrocarbons. Other organic residues, packaging materials, heavy metals, radio nuclides in foods.

#### UNIT-IV

- 7. Naturally occurring toxicants & food contaminants:** Sea food toxins, biogenic amines, mutagens & carcinogens in heated & processed foods, coffee & methylxanthines, toxicity of mushrooms alkaloids compounds, glucosinolates, protease inhibitors, phytate, other antinutritional compounds.
- 8. Safety aspects of foods produced by biotechnology and genetic engineering.**

#### References:

1. OECD Documents (1996): Food Safety Evaluation. Organization for Economic Co-operation and Development Paris.
2. World Health Organization (1990): Strategies for Assessing the Safety of Food Produced by Biotechnology. Report of a Joint FAO/WHO Consultation- Geneva.
3. Walker and Quattrucci, E. (eds) (1980): Nutritional and Toxicological Aspects of Food Processing, Taylor and Francis, New York.
4. Lava, K.; Muller, E.I.; Toxicological Aspects of Foods; Elsevier Applied Science, London.
5. Lee, L.W. (ed) (1995): Human Tissue Monitoring and Specimen Banking; Opportunities for Exposure Assessment, Risk Assessment and Epidemiologic Research. Proceedings of a Symposium Research Triangle Park, NC, March 30 to April 1, 1993. Environ. Health Perspect. 103 (suppl.3)1.
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8. Yang, R.S.H. (ed) (1994): Toxicology of Chemical Mixtures, Case Studies, Mechanisms and Novel Approaches, Academic Press, New York.
9. Finley, J.W., Robinson, S.F. and Armstrong, D.J. (1992): Food Safety Assessment, ACS Symposium Series, American Chemical Society, Washington.
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12. McMurray, C.H., Stewart, E.M., Gray, R. Pearce, P. (ed) (1996): Detection Method for irradiated Foods- Current Status, Vol. 14, Academic Press, New York.
13. Varnham, A.H. Evans, M.G. (1991): Foodborne Pathogens Wolfe.
14. Doyle, M.D. (ed) (1989): Food-borne Bacterial Pathogens, Marcel Dekker, New York.
15. Hayatsu, H. (1991) Mutagens in Food: Detection and Prevention. CRC Press.
16. Bronzetti, G.; De Flora, S.; Waters, M.D. and Shankel, D.M/ (1993): Antimutagenesis and Anticarcinogenesis Mechanisms Plenum Press, New York.

**Paper: HSc-Ph.D.-III (a)**  
**Research and Publication Ethics (RPE)**

Total Marks: 50  
Time: 3 hrs

Note: Nine questions will be set in all. Question No 1 which will be short answer type covering the entire syllabus, will be compulsory. Attempt five questions in all.

**Syllabus in detail**

**THEORY**

**I: PHILOSOPHY AND ETHICS**

- i. Introduction to philosophy: definition, nature and scope, concept, branches.
- ii. Ethics: definition, moral philosophy, nature of moral judgments and reactions.

**2: SCIENTIFIC CONDUCT**

- i. Ethics with respect to science and research
- ii. Intellectual honesty and research integrity
- iii. Scientific misconducts: Falsification, Fabrication. And Plagiarism( FFP)
- iv. Redundant publications: duplicate and overlapping publications, salami slicing
- v. Selective reporting and misrepresentation of data

**3: PUBLICATION ETHICS**

- i. Publication ethics: definition, introduction and importance
- ii. Best practices/standards setting initiatives and guidelines: COPE.WAME, etc.
- iii. Conflicts of interest
- iv. Publication misconduct: definition. concept. problems that lead to

- unethical behavior and vice versa, types
- v. Violation of publication ethics. Authorship and contributorship
- vi. Identification of publication misconduct. complaints and appeals
- vii. Predatory publishers and journals

## PRACTICE

### 4: OPEN ACCESS PUBLISHING

- i. Open access publications and initiatives
- ii. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies
- iii. Software tool to identify predatory publications developed by SPPU
- iv. Journal finder/journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester etc.

### 5: PUBLICATION MISCONDUCT

- i. Subject specific ethical issues. FFP, authorship
- ii. Conflicts of interest
- iii. Complaints and appeals: examples and fraud from India and abroad
- iv. Software tools: Use of plagiarism software like Turnitin, Urkund and other open source software tools

### 6: DATABASES AND RESEARCH METRICS

#### 6.1 Databases

- i. Indexing databases
- ii. Citation databases: Web of Science, Scopus, etc.

#### 6.2 Research Metrics

- i. Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
- ii. Metrics: h-index, g index, i10 index, altmetrics

## References

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- MacIntyre, Alasdair (1967) *A Short History of Ethics*. London .

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Resnik, D. B. (2011). What is ethics in research & why is it important. *National Institute of Environmental Health Sciences*, 1-10. Retrieved from

<https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>

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