DEPARTMENT OF FOOF SCIENCE AND TECHNOLOGY

REVISED CURRICULUM AND SYLLABI

(With effect from the academic year 2017 – 2018 onwards)

Ph.D Part I-Paper I

Food Science and Nutrition & Food Science and Technology

DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY
PONDICHERRY UNIVERSITY

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INDIA

Unit I – Introduction to research methodology

Meaning of Research: Purpose, Characteristics and Types of Research – Process of Research – Formulation of objectives – Formulation of Hypothesis – Methods of testing Hypothesis – Research plan and its components – Methods of research (*In vitro, In vivo,* Animal model, Cell Culture, Clinical trials – Phase I and Phase II).

Unit II – Collection, presentation and analysis of data

Sources of Data: Primary and Secondary Sources – Methods of collecting Primary Data – Designing Questionnaires/Schedules, Methods of Sampling – Random and Non-Random Sampling methods, Processing and Presentation of Data – Editing, coding classification and tabulation – Graphic and Diagrammatic presentation. (Theory only).Statistical analysis of Data: Measures of Central Tendency, Measures of Variation, skewness, Student t test, Chi square, analysis of variance, correlation and regression. (Theory only).Basic concepts and methods Randomness of biological observations. Experimental and observational data. Types of data: nominal, ordinal, continuous variables. Data summary measures. Graphical representations. Concepts of probability and probability distributions. Parameter estimation: mean, proportion, standard deviation, standard error. Concepts of statistical inference: confidence intervals and hypothesis tests. Elementary parametric hypothesis tests. Univariate linear regression. Statistical modeling and multivariate regression methods Multivariate linear regression and general linear model. Continuous and categorical predictors. Interactions. Model fitting and diagnostics. Generalised linear models and logistic regression. Survival analysis and Cox proportional hazard models. Modeling and classification of high-dimensional data Multiple testing and types of errors. Control of errors, including false discovery rate. Feature selection. Distance measures and clustering. Classification and prediction algorithms. Validation and cross-validation.

Unit III – Interpretation and report writing

Interpretation: Essentials of Interpretation, Precautions in interpretation – Conclusions and generalization. Statistical facilities: bias, inconsistency in definitions, inappropriate comparisons, faulty generalizations, drawing wrong inferences, misuse of statistical tools, failure to comprehend the data.

Report writing: Meaning and types of reports – Stages in preparation of Report – Characteristic of good report – Structure of the Report- Documentation: Footnotes and Bibliography: Checklist for the Report.

Unit IV – Laboratory Techniques

Microscopy- Simple, compound, fluorescent, electron and confocal; colorimetry and spectrophotometery; Principles and working, Beer-Lamberts law; Centrifugation: Principle and

working; Chromatography: Types, Principle and applications ; Microbiology: Enumerations, isolation and Staining, preparation of pure cultures and preservation; Immunological methods: Antibodies, Monoclonal and Polyclonal, ELISA, Fluorescent antibody and RIA; Electrophoresis: Types, Principle and applications; Polymerase chain reaction: Principle, working, types. Rheological (viscometery, texture analysis, amylograph, extensograph, RVA) and thermal (DSC, TGA) analysis. Whole Genome Sequencing.

Unit V - Ethics in research and Intellectual Property Rights

Ethics in Research: What is Ethics in Research & Why is it Important? Ethical issues with human subjects; ethical issues with animal studies. Codes and policies for research ethics; ethical decision making in research.

IPR: What is IPR- definition. Patent regulation, Indian and International scenario.

Patents; Copyright; Industrial design rights; Plant varieties; Trademarks; Trade dress; Trade secrets. How to protect IPR- filing of patent process in brief.

References
1. Gosh.B.N., Scientific Methods and Social Research Sterling Publishers Pvt. Ltd., New Delhi. 2008.
2. Kothari.G.R., Research Methodology, Methods and Techniques, Wiley Eastern Limited, New Delhi, 2004.
3. Kulbir Singh Sidhu, Methodology of Research in Education Sterling Publishers Pvt. Ltd., New Delhi. 2006.
4. Gupta. S.P., Statistical Methods, Sultan Chand and Sons. New Delhi, 2002
5. Srivastava.A.B.L and Sharma.K.K., Elementary Statistic in Psychology and Education, Sterling Publishers Pvt. Ltd., New Delhi. 2003.