

PAPER 1: (RESEARCH METHODOLOGY)

Marks: 100

Unit – I

- Sampling: Steps and techniques, size of sample, sampling and non- sampling errors.
- Measures of dispersion: Quartile deviation, Mean Deviation, Standard deviation, Coefficient of variation.
- Correlation Analysis: Concept and significance, Karl parson's coefficient of correlation, Rank correlation and concurrent deviations (Ungrouped data).
- Regression analysis: Lines of regression and Regression equations.

Unit – II

- Testing of hypothesis: Chi- square, t-test and F- test
- Analysis of variance: Concept and assumptions, Computation of one way analysis of variance.
- Experimental Design: RBD and LSD.
- Software packages: SPSS and Mini-tab.

Unit – III

- Principles and application of atomic absorption spectroscopy– Components of atomic absorption spectroscopy, ICP.
- X-ray analysis of foods– Properties, production & detection, x- ray tubes , detectors , x- ray fluorescence , sources , application in food industry.
- Mass spectroscopy– Components, Low voltage Mass Spectrometry, Quantitative analysis.
- Chromatography– Different types (HPLC, Paper Chromatography, TLC, GLC) their principles and applications.

Unit – IV

- Rheology measurement–Viscosity measurement, Texture analysis.
- Electrophoresis–Applications, principles of separation of neutral molecules, separation of optical isomers and buffers.

- Differential Scanning Calorimetry; SEM.
- **Nuclear magnetic resonance (NMR)** – Principle, Components, Interpretation of NMR spectra, application of NMR.
- **Immunoassays**- application in foods with special reference to ELISA

References:

1. Introductory Statistics by Prem S. Mann.
2. Statistical Methods by S.P Gupta.
3. Statistics by William L. Hays.
4. Food Analysis by Pomeranz.
5. The Chemical Analysis of Food and Food Products by Jacobs.

Unit – I

- General introduction to cereals, new varieties, production trends of wheat, rice, corn, barley, oats, sorghum and millets in India.
- Structure, composition and nutritive value of cereals.

Unit – II

- Cereal protein: composition of their major fractions and methods for identification.
- Cereal carbohydrates: starch granule structure and modification of starch.
- Cereal lipids: Whole grain lipids, lipid composition in various grain fractions.

Unit – III

- Rice: Grain structure, chemical composition, milling, milling machine.
- Effect of different factors on milling yield and rice quality. By products of rice milling and their utilization.
- Parboiling of rice, effect of aging on rice quality, rice products, enrichment of rice with vitamins and minerals, byproduct utilization.
- Traditional and fermented rice products.

Unit – IV

- Functional Foods: Definition and classification.
- Probiotics and prebiotics.
- Dietary fiber and its physiological effects.
- Resistant starch: Introduction, Production and health effects of resistant starch. Resistant starch for food development.
- Influence of other food components on starch digestion rate.

REFERENCES

1. Handbook of cereal science and technology by Karel Kulp & Joseph G.Pante
2. Technology of functional cereal products by Bruce R. Hamaker.
Modern cereal science & technology by B.O.Juliano.