- Mann J, Truswell AS, Essentials of Human Nutrition second edition 2002, Oxford University Press


## FNS 454 ANALYTICAL TECHNIQUES IN FOOD SCIENCE

**39 Hr (13× 3 units)**

**Course outcome:**

*At the end of this course the students will gain in-depth knowledge of-*

CO 1. Various analytical techniques used in food industry.
CO 2. Different techniques used in chromatography to differentiate nutrients and other chemical compounds in foods.
CO 3. Chemical properties and role of enzymes in food industries.
CO 4. Techniques in proximate analysis of foods and feeds including anti-nutritional factors and antibiotics.

**Unit I:** Techniques – paper, TLC, Gel filtration, ion exchange, affinity, HPLC and GLC. Spectroscopy - UV-visible, fluorescent spectroscopy, CD spectroscopy, NMR. Radiotechniques – nature of radiation sources, radioactive decay, units of radiation, detection and measurements of radioactivity, autoradiography, GM counter, Scintillation counter.

**Unit II:** Optimisation of PCR reactions and application in food technology, immunological techniques. Extraction, isolation and purification of soluble and membrane bound enzymes. Enzyme. Isolation of enzymes, extraction of soluble and membrane bound enzymes purification of enzyme- criteria for purification.

**Unit III:** Quantification of organic acids (citric acid). Proximate analysis of foods and feeds (moisture, nitrogen, crude fiber, crude lipids and ash). Mineral analysis of foods and feeds. Vitamin assay (water soluble and fat soluble). Analysis of antinutritional factors (phenolics). Estimation of secondary metabolites (antibiotics).

**REFERENCES**


- Raghuramulu et al. 1983. A manual of Laboratory Techniques, NIN, ICMR, Hyderabad
- Plummer, D.T. 1971. An introduction to practical Biochemistry, McGraw Hill Pub. Co., New York,
- Khopkar S.N. Basic Concepts of Analytical Chemistry (2nd ed), New Age Pub.
- Upadhaya A. Biophysical Chemistry – Principles and techniques –Himalaya pub.
- King R.D., 1978 Developments in Food Analysis – Applied Science Publishers Ltd., London,
- Joslyn, M.A., 1970. Methods of Food Analysis –Academic Press, New York,
- Friedlander G., Kennedy JW., Macias ES., et al. 1981Nuclear and Radio Chemistry – 3rd ed. John Wiley and sons
- Hudson et al 1986. Practical Immunology –., Blackwell scientific pub
- Old and Primrose 1994. Principles of Gene Manipulation, Blackwell scientific Pub.,
- Skooge D.A. Principles of Instrumental Analysis, Holt-Saunders, 1985
- Morris, C.J. and Morris, P. 1976. Separation Methods in Biochemistry, Pitman Publ., London