

# ADIKAVI NANNAYA UNIVERSITY

## RAJAMAHENDRAVARAM

### CBCS / Semester System

(From 2015-16 Admitted Batch)

### B.Sc. Food Technology

### III Semester Syllabus

#### UNIT OPERATIONS IN FOOD PROCESSING - 1

##### Unit -I:

Unit Operations- classifications – conservation of mass and energy. SI, FPS and MKS system of Units- Evaporation- single effect evaporation and multiple effect evaporation, vacuum evaporation – short tube and long tube evaporators, its applications in food industry.

##### Unit-II:

Mechanical separation - Filtration, filtration equipment, sedimentation, centrifugal and liquid-liquid separation centrifuge its applications. Size Reduction and Separation: Introduction, methods of separation, Grinding and cutting, Energy used in grinding, Characteristics, particle size distribution, energy & power requirement. Crushing efficiency, Kick's law, Rittinger's law, Bond's law.

##### Unit-III:

Contact equilibrium - separation processes- concentrations- gas – liquid equilibria. Solid – solid equilibria – equilibrium concentration – extraction – rate of extraction, stage equilibrium extraction. McCabe Thiele plot.

##### Unit-IV:

Introduction and importance of Physical properties-Shape and size of grains, Shape and size of Fruits, Bulk density of the grains, True density of the grains, Porosity, Angle of repose, Test weight, Cleaning, Sorting and Grading. Peeling, Dehulling, Dehusking,

##### Unit-V:

Mixing Definition, Measurement of Mixing, Mixing index, Mixing Equipment- Double cone mixer, Ribbon mixer, Kneader, Propeller mixer. Forming-Bread molders, Pie and biscuit formers, Confectionery molders.

##### Practicals:

1. Determination of separation efficiency of centrifugal separator.
2. Determination of energy requirement in size reduction using ball mill.
3. Determination of collection efficiency of cyclone separator.
4. Problems on evaporators.
5. Determination of particle size distribution using sieve shaker.
6. Performance evaluation of sieve.
7. Visit to solvent extraction unit.
8. Visit to sugar industry.
9. Performance evaluation of hammer mill.
10. Determination of Moisture content by hot air oven method.

**Books for Reference:**

1. Chakravarthy A, *Post Harvest Technology of Cereals, Pulses and Oilseeds*, Oxford and IBH Publications Company Limited, Calcutta, 1988.
2. Charm S.E, *Fundamentals of Food Engineering*, The AVI Publishing Company, USA, 1971.
3. Dennis R.H, *Food Process Engineering*, The AVI Publishing Company, 1971.
4. Earle R.L, *Unit Operations in Food Processing*, Pergamaon press, New Delhi, 1983.
5. Mc Cabe and Smith J.C, *Unit Operations of Chemical Engineering*, Tata Mc Graw Hill Publishing Book Company, New Delhi, 1993.
6. Geankoplis CJ, Allyn & Bacon Inc. Newton, Massachusetts, *Transport Process & Unit Operations*, 1978.
7. Sahay K.M. & Singh K.K, *Unit Operations of Agricultural Processing*, Vikas Publication House, New Delhi.