

**Course No :** PFE 244 **Course Title :** Post Harvest Engineering of Cereals, Pulses and Oil seeds

**Credits:** 3 (2+1) **Semester :** IV

## **Syllabus**

### **Theory**

Introduction, Unit operations of grain processing. Cleaning and grading, aspiration, scalping. Screens and sieves-Types, classification, Ari screen cleaner- and capacity, effectiveness of screens. Various types of separators- specific gravity, magnetic, disc, spiral, pneumatic, inclined draper, velvet roll, colour sorters, cyclone.

Size reduction: principle, Bond's law, Kick's law, Rittinger's law, procedure (crushing, impact, cutting and shearing), Size reduction machinery: Jaw crusher, Hammer mill, Plate mill, Ball mill. Sieve analysis and particle size.

Drying: moisture content; Free, bound and equilibrium moisture content, isotherm, hysteresis effect, EMC determination. Psychrometric chart and its use in drying.

Drying principles and theory, Thin layer and deep bed drying analysis, Falling rate and constant rate drying periods, maximum and decreasing drying rate period. Drying equations, Mass and energy balance. Methods of drying, types of grain dryers.

Milling of paddy, Type of rice milling machinery. Modern rice milling – unit operations and machines. Parboiling of paddy – importance and methods. milling of maize- methods and processed products, milling of wheat operations and machineries. Processing of sorghum and millets. Milling of pulses-Unit operation, methods and machines.

Processing of oilseeds- Unit operations. Mechanical expression and solvent extraction methods.

Mixing: Theory of mixing of solids and pastes, Mixing index, types of mixers for solids, liquid foods and pastes.

Material handling equipment. Types of conveyors: Belt, roller, chain and screw. Pneumatic conveying. Bucket Elevator. Cranes & hoists. Trucks (refrigerated/ unrefrigerated),

### **Practical**

Performance evaluation of different types of cleaners and separators, Determination of separation efficiency, Study of different size reduction machines and performance evaluation, Determination of fineness modulus and uniformity index, Study of different types of conveying and elevating equipments, Study of different types of mixers. Measurement of moisture content: dry basis and wet basis, Study on drying characteristics of grains and determination of drying constant, Determination of EMC (Static and dynamic method), Study of various types of dryers, Study of different equipments in pulse mills and their performance evaluation, Visit to grain processing industries.

