

**FT301 LEGUME AND OIL SEED TECHNOLOGY****Course Description & Objectives:**

*This course will impart knowledge to the students on Legume and Oil Seed Processing.*

*By the end of the course students will be able to develop good expertise on the technical aspects of dhal milling, oil milling and various legumes and oil seeds based product preparations.*

**Course Outcomes:**

*By the end of the course, the students will be able to*

- 1. Know about different pulses processing aspects and preparation of products with pulses*
- 2. Learn about different oil seeds, oil milling by expellers, solvent extraction of oils, refining of oils and utilization of oil seed meals for different food uses.*

**UNIT I - Pulse Classification and Processing**

Present status and future prospects of legumes - Current trends in area, production and yield – Technology Mission on Oil seeds and Pulses (TMOP). Morphological description of pulses. Classification and types of legumes - Chemical composition and nutritional Value. Anti-nutritional factors in pulses and their chemistry - Methods of removal of anti-nutritional factors. Processing of legumes - Milling, Soaking, Germination, Fermentation, Roasting and Parching, Extrusion, Parboiling and Agglomeration. Physical and chemical changes during the processing of legumes

**UNIT II - Milling of Pulses**

Dehulling of pulses - Advantages - Methods of dehulling - Traditional and modern methods of dehulling. Dehulling pretreatments - wet treatment, soaking, chemical treatment, dry treatment, oil treatment and heat treatment. Seed characteristics that affect dehulling - Nature of seed coat and physical characteristics of grains. Storage of pulses - Insect control measures in pulses. Milling of pulses - Wet milling and dry milling- Commercial milling of

pulses by traditional methods. Dry milling of Tur, Black gram, Bengal gram, Wet milling of Tur - Modern CFTRI method of pulse milling

### **UNIT III - Pulse's Value Added Product**

Dhal milling equipment and effect on quality - Principal products. Fermented products of legumes - Idli, Dosa, Soya curd(Tofu), Textured Vegetable Protein (TVP), Soya sauce, Tempeh, Natto and Miso. Cooking quality of dhal - Factors affecting cooking quality of dhal and Legumes – Processed legume products - Puffed chick pea and Peas, Canned dry pea. Quick cooking dhal and instant dhal - Uses of pulses - Role of pulses in cookery – Medicinal value of pulses. Present status and future prospects of oil seeds - Annual oil crops, Perennial oil seed plants and Minor oil seeds - Chemical composition and characteristics of oil seeds and oils. Anti-nutritional factors in oil seeds -

### **UNIT IV- Post-Harvest Technology of Oil Seeds**

Post-Harvest Technology of oil seeds - Handling- Drying and Storage - Grading – Pretreatments - Cleaning -Dehulling - Size reduction - Flaking - Heat treatment. Oil extraction - Rendering - Traditional methods - Ghani -Power ghanis - Hydraulic Press- Expellers - Principle and structural design of expeller. Solvent extraction process - Principle - Pretreatment - Breaking - Cracking - Flaking - Extraction principles - Factors affecting the extraction process - Desolventisation. Processing of oil seeds - Production and refining of cotton seed oil -Mechanical expression of cotton seed oil - Refining of crude cotton seed oil. Solvent extraction of soya bean oil- Sunflower oil - Palm oil - Coconut oil. Utilization of rice bran - Stabilization of rice bran - Dry heat treatment - Wet heat treatment. Extraction of rice bran oil - Solvent extraction - batch and continuous methods

### **UNIT V- Refining of Oils**

Refining of oils - Degumming - Neutralization - Bleaching - Filtration – Deodorization - Winterization -Principles and process controls. Refining of crude bran oil into edible oil - Uses of bran and bran oil. Hydrogenation - Products based on hydrogenated fats -Margarine - Shortenings – Salad oils - Vanaspati – Sal addressesings - Rancidity in fats and oils - Types of rancidity - Tests for rancidity. New technologies in oil seed processing. Utilization of oil seed meals for different food uses . High protein products - Protein concentrates - Protein isolates

### **TEXT BOOKS:**

1. Chakraverty A. *Post Harvest Technology of Cereals, Pulses and Oil seeds*. Oxford and IBH Publishing Co. Ltd., Calcutta, 2005.
2. Chakraverty A, Majumdar A.S, VijayaRaghavan G.S and Ramaswamy H.S. *Hand Book of PostHarvest Technology*. Marcel Dekker Inc., New York. Basel, 1999.

### **REFERENCES:**

1. Achayya K.T. *Oil seeds and Oil Milling in India*. Oxford and IBH Publishing Co., New Delhi, 1999
2. Barid and Hamson. *Hand Book of Solvent Extraction*.
3. Chakraverty A, Majumdar A.S, VijayaRaghavan G.S and Ramaswamy H.S. *Hand Book of PostHarvest Technology*. Marcel Dekker Inc., New York. Basel.
4. Guriqbal Singh, Harbhajan Singh Sekhon and Jaspinder Singh Kolar. *Pulses*. Agrotech Publishing Academy, Udaipur.
5. Jaswanth Singh and Shukla B.D. *Post Harvest Technology of Oil Seeds*. Central Institute of Agricultural Engineering, Bhopal.