

II Year II Semester

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## AG 210 Crop Production & Process Engg

### Course Description & Objectives:

To study basic features of crop production methods including the agronomical and soil aspects. To study the processing technology of various agricultural products.

### Course Outcomes:

The students will have:

1. the necessary knowledge about production of agricultural and horticultural crops.
2. basic knowledge about processing and material handling of harvested crops.

### Crop Production

#### Unit I: Soil Science:

Soils: Nature and origin of soil; soil forming rocks and minerals, their classification and composition, soil forming processes, classification of soils – soil taxonomy orders; important soil physical properties; and their importance; soil particle distribution; soil inorganic colloids – their composition, properties and origin of charge; ion exchange in soil and nutrient availability; soil organic matter – its composition and decomposition, effect on soil fertility; soil reaction – acid, saline and sodic soils.

#### Unit II: Agronomy:

Agronomy: Definition and scope of agronomy. Classification of crops, Effect of different weather parameters on crop growth and development. Principles of tillage, tilling and its characteristics. Soil water plant relationship and water requirement of crops, weeds and their control, crop rotation, cropping systems, Relay cropping and mixed cropping.

### Process Engineering

#### Unit III: Processing of Agricultural products:

Scope and importance of food processing, post harvest losses, principles and methods of food processing. Processing of farm crops; cereals, pulses, oil seeds, fruits and vegetables and their products for food and feed. Processing of animal products, minimal processing, Principle of size reduction, grain shape, size reduction machines; crushers, grinders, cutting machines etc. – operation, efficiency and power requirement – Rittinger's, Kick's and Bond's equation, fineness modulus.

**Unit IV: Mixing and Separation:**

Theory of mixing, types of mixtures for dry and paste materials, rate of mixing and power requirement, mixing index. Theory of separation, size and unsized separation, types of separators, size of screens, sieve analysis, capacity and effectiveness of screens, pneumatic separation.

**Unit V: Material Handling:**

Microwave and Dielectric heating. Extrusion processing, Scope & importance of material handling devices, study of different types of material handling systems; belt, chain and screw conveyor, bucket elevator, pneumatic conveying, gravity conveyor design consideration, capacity and power requirement.

**TEXT BOOKS:**

1. Chakravarty, A. (1995). *Post Harvest technology of Cereals, Pulses and Oil Seeds*. Oxford and IBH Pub. Co., Calcutta

**REFERENCES:**

1. De, G.C. (1989). *Fundamentals of Agronomy*. Oxford & IBH Publishing Co Pvt Ltd, New Delhi.
2. Russel.(2002). *Soil Condition and Plant Growth*. ELBS, Longmans, U.K.
3. Pande,P.H. (1994). *Principles of Agricultural Processing A Text Book*. Kalyani Publishers, Ludhiyana.
4. Sahay, K.M and Singh, K.K. (1994). *Unit Operation of Agrl. Processing*. Vikas Publishing House Pvt Ltd, New Delhi.
5. Bose, T.K and S.K. Mitra. (1990). *Fruits, Tropical and Subtropical*. Naya Prakash, 206 Bidthan saran, Calcutta.
6. Brady, Nyle C. (1988). *The nature and properties of Soils*. Eurasia Publishing House Pvt Ltd, New Delhi.
7. Das, P.C. (1993). *Vegetable Crops of India*. Kalayani Publishers, New Delhi.
8. Earle,R.L. (1985). *Unit Operations in Food Processing*. Pergamon Press, Oxford.U.K.
9. Fellows, P. (1993). *Food Processing technology, Principles and Practice*. Ellis Horwood,USA.
10. Handerson, S.M and Perry, R.L. (1955). *Agrl. Process Engg*. John,Wiley & Sons, New York.
11. [http://ecourses.iasri.res.in/e-Leaarningdownload3\\_new.aspx?Degree\\_Id=04](http://ecourses.iasri.res.in/e-Leaarningdownload3_new.aspx?Degree_Id=04)