

DEPARTMENT OF HOME SCIENCE

B.A (PROG) WITH FOOD TECHNOLOGY (FT)

B.A. (Prog) with Food Technology (FT) as Major & Non-Major Pool DSE: Odd Semester

DISCIPLINE SPECIFIC ELECTIVE COURSE – DSE-1-FT: CEREAL AND PULSE TECHNOLOGY

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Cereal and Pulse Technology	4	3	0	1	Class XII Pass	NIL

LEARNING OBJECTIVES:

1. To acquaint students with various types of indigenous grains available.
2. To impart knowledge regarding post-harvest technology of various cereals, millets and pulses.
3. To acquaint students with processing of cereals, millets and pulses with principles, mechanism and machinery involved.

COURSE OUTCOMES:

After completion of the course the students will be able to -

1. Understand basic composition and structure of food grains.
2. Understand the basics of milling operations and storage of grains.
3. Learn processing of food grains into value added products.
4. Access the physical and cooking properties of cereals, millets and pulses.

SYLLABUS OF DSE-1-FT

THEORY (Credits 3: 45 Hours)

UNIT I: Introduction to Cereals, Millets and Pulses

(7 Hours)

- *Unit Description:* This unit will introduce the students to various grains in Indian context with its production, utilization, availability and grading standards.
- *Subtopics:*

- General introduction
- Production and utilization trends
- Grain classification
 - Classification of cereals, pulses and millets
 - Market varieties of various grains available in India
 - Grading standards of various grains

UNIT II: Staple Grain Processing

(18 Hours)

- *Unit Description:* This unit will focus on various aspects pertaining to the composition and processing of staple cereals with the related processed products.
- *Subtopics:*
 - Structure, physico-chemical properties of staple grains (wheat, rice, corn)
 - Wheat processing
 - Cleaning, tempering, conditioning and milling of wheat
 - Flour treatments (bleaching, maturing) and grading
 - Wheat products (Wheat flour, semolina, dahlia)
 - Rice processing
 - Milling and parboiling of paddy
 - Curing and ageing of paddy and rice; cooking and storage qualities of raw and parboiled rice
 - Rice products (Polished rice, Brown rice, popped, puffs, rice rawa, rice flour)
 - Corn processing
 - Dry and wet milling
 - Starch and its conversion products and processed corn products (popped corn, corn flakes etc.)

UNIT III: Coarse grain and Millet Processing

(10 Hours)

- *Unit Description:* This unit describes the composition and processing of coarse grains and millets with their respective products.
- *Subtopics:*
 - Oats Processing
 - Physico-chemical properties and composition of millets
 - Primary processing operations of millets
 - Coarse grain and millet processed products.

UNIT IV: Pulse Processing

(10 Hours)

- *Unit Description:* This unit will focus on composition and processing of pulses with its respective products.
- *Subtopics:*
 - Structure, physico-chemical properties and composition of pulses and legumes
 - Traditional and modern milling methods
 - Soybean Processing
 - Products and by-products of pulse milling

PRACTICAL **(Credits 1: 30 Hours)**

No. of Students per Practical Class Group: 10-15

1. Physical properties of staple grains (seed weight, seed volume, seed density and hydration capacity)
2. Physical properties of millets (seed weight, seed volume, seed density and hydration capacity)
3. Cooking parameters of rice (water uptake ratio, gelatinization temperature)
4. Popping of grains (wheat/rice/corn/millets)
5. Product preparation from pulses (cleaning, soaking, drying, de-husking, product preparation)
6. Preparation of amylase rich/malt flour from grains
7. Visit to a cereal/pulse processing plant.

ESSENTIAL READINGS (Theory and Practical):

- Rosentrater, K. A., and Evers, A. D. (2017). *Kent's Technology of Cereals: An Introduction for Students of Food Science and Agriculture*. Woodhead Publishing.
- Rice Milling Manual by IRRI. http://www.knowledgebank.irri.org/ericeproduction/PDF_Docs/Teaching_Manual_Rice_Milling.pdf(accessed on 17.3.2023)
- Kate, A. and Singh, A. (2021). Processing Technology for Value Addition in Millets. In: Kumar, A., Tripathi, M.K., Joshi, D., Kumar, V. (eds) *Millets and Millet Technology*. Springer, Singapore. https://doi.org/10.1007/978-981-16-0676-2_11(accessed on 17.3.2023)
- Chapke et al. 2020. Latest millet production and processing technologies. Indian Institute of Millet Research. https://www.millets.res.in/farmer/Latest_Millet_English_Full_Book_2020.pdf
- Potter, N. N., and Hotchkiss, J. H. 2012. *Food Science*. Springer Science and Business Media.
- Williams, P.C.; Nakoul, H. and Singh, K.B. (1983). Relationship between cooking time and some physical characteristics in chickpea (*Cicer arietinum* L.). *J. Fd. Sci. Agric.* 34: 492-495.
- Oko, A.O., Ubi, B.E., Efiue, A.A. and Dambaba, N. (2012). Comparative analysis of the chemical nutrient composition of selected local and newly introduced rice varieties grown in Ebonyi state of Nigeria. *International Journal of Agriculture and Forestry*. 2(2): 16-23.
- Chandra, S. and Samsher, L. (2013). Assessment of Functional Properties of Different Flours. *African Journal of Agricultural Research*, 8, 4849-4852.
- <https://egyankosh.ac.in/bitstream/123456789/45848/1/Experiment-12.pdf>(accessed on 17.3.2023)
- <http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5933>(accessed on 17.3.2023)
- Nwosu, J.N.; Owuamanam, C.I., Omeire, G.C. and Eke, C.C. (2014). Quality parameters of bread produced from substitution of wheat flour with cassava flour using soybean as an improver. *American J. Res. Commu.*, 2 (3): 99-118.

SUGGESTED READINGS:

- Davis, J. G. (1982). *Food Science and Technology*: By Magnus Pyke, revised and enlarged by LelioParducci. John Murray, London, 304 pp
- Chakraverty, A., Raghavan, G. S. V., & Ramaswamy, H. S. (2003). *Handbook of post-harvest technology*. Marcel Dekker, Inc
- Hosney, R. C. and Delcour J. A. (2010). *Principles of Cereal Science and Technology* (No. Ed. 3). American Association of Cereal Chemists (AACC).
- Dendy DAV and Dobraszczyk B.J. (2001). *Cereal and Cereal Products*. Aspen
- Karl, K. (2000). *Handbook of Cereal Science and Technology*. 2nd Rev. Edition. CRC Press
- Matthews, R. H. (1989). *Legumes: Chemistry, Technology, and Human Nutrition*. American Association of Cereal Chemists (AACC).
- Sethi, P. and Lakra, P. (2015). *Aahar Vigyan, Poshan Evam Suraksha*. Delhi: Elite Publishing