GUJARAT TECHNOLOGICAL UNIVERSITY

FOOD PROCESSING & TECHNOLOGY (14)
TECHNOLOGY OF GRAINS
SUBJECT CODE: 2151406
B.E. 5th SEMESTER

Type of course: Food Processing Technology

Prerequisite: Nil

Rationale: This subject is aimed at imparting knowledge and skills related to the processing techniques, value addition, and handling of processing equipment of cereals, pulses and oilseeds to the students, as the understanding of these aspects is essential for the students to perform efficiently and effectively in the industry.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Properties of Food Grains:** Supply chain of food grains, Hydrothermal treatment of grains-physico-thermal properties, biochemical properties, physico-chemical properties, Effect of different factors on various properties.	4	12
2	**Rice** : Parboiling and milling of paddy, Aging of rice, Rice enrichment, Processed rice products.	14	22
3	**Wheat:** Wheat and its quality characteristics for milling into flour and semolina, Flour milling, Turbo grinding and air-classification, Flour grades and their suitability for baking purposes, Assessment of flour quality and characteristics.	10	18
4	**Corn and Other cereals:** Dry and wet milling of corn, corn starch and its conversion products, Malting of Barley, Milling of millets.	6	14
5	**Milling of Pulses:** Traditional milling, Commercial milling and Modern methods of milling. Factors affecting milling of pulses, Pulse based extruded products.	8	16
6	**Processing of Oilseeds:** Pre-treatment, Oil extraction methods, Processing of extracted oil: Refining, Hydrogenation, Processing of deoiled cake: Protein rich products, Soybean processing.	8	18

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
18	**18**	**20**	**22**	**22**	**-**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Post harvest technology of Cereals, Pulses and Oilseeds by Chakravarti A. Oxford Publishing.
2. Cereal Technology by Potter NN. AVI Publication.
3. Unit Operations of Agricultural Processing by K.M. Singh and K.K. Sahay
4. Bakery Science & Cereal Technology by Neelam Khatarpaul, Rajbala Grewal & Sudesh Jood (Daya publishing house).
5. Bakery Technology and Engineering by Matz SA.CBS Publication.
6. Manuals on Rice and its processing by CFTRI Mysore and IIT Kharagpur

Course Outcome:

After learning the course the students should be able to:

a. Understand the importance of supply chain of grains, properties of the grains.
b. Define processes employed in the milling of grains through construction of Process Flow Diagrams.
c. Understand the milling operations of paddy, wheat, corn, pulses and oil seeds and the utilization of byproducts.
d. Identify the problems associated with milling of grains and their solution.
e. Storage of the grains

List of Experiments:

1. To study the physical properties of rice
2. To study the physical properties of paddy
3. To study the cooking quality of rice using water up takes method.
4. To prepare sprouted or germinated pulses or beans
5. To prepare parboiled paddy by pressure boiling method
6. Determination of Angle of Repose of grains
7. Preparation of quick cooked rice
8. To study the methods of extraction of oil from oilseeds
9. Determination of slipping point of fat
10. Determination of under milled grains from polished rice

Design based Problems (DP)/Open Ended Problems:

To know the quality of grains. How to determine the physical properties of grains and to know their importance. To know the malting and parboiling of grains. How to extract the oil from oil seeds by various methods. How to do the enrichment of milled products.

Major Equipments:

a. Grain dryer
b. Specific gravity separator
c. Cyclone separator

d. Sieve shaker
e. Water bath
f. Angle of repose equipment
g. Mini oil expeller
h. Mini dal mill

List of Open Source Software/learning website

a. www.**iicpt**.edu.in
b. sch.vscht.cz/materialy/erasmus/CCHT2Engl-Hr-2010.pdf
c. www.cftri.com/**milling**.html
d. www.grains.k-state.edu
e. www.**grainmilling**.org.za/**mill**er.htm

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.