

FST-213, Sugar Technology 3 (2-1)

Educational Objectives:

After the completion of this course, a student will be able to: Understand the Production and Demand supply of sugar production. Understand the various production techniques Have a better understanding of various byproducts that can be manufactured along with sugar production. Global challenges and opportunities in sugar production technologies

Course Outcomes:

After successful completion of the course work, students will have the skills to:

1. Understand the challenges faced by the Pakistan Sugar industries.
2. Understand the production of sugarcane and sugar beet.
3. Identify the basic techniques involved in indigenous Gur making.
4. Identify different unit operations involved in raw sugar making.
5. Understand the working principles and design of different equipments used for the extraction, purification, evaporation, and crystallization the cane juice.
6. Understand the unit operations involved in the refining of raw sugar.
7. Learn different quality criteria for raw and refine sugars 8. Understand the factors involved in raw sugar production

Course Contents:

- Sugar industry in Pakistan.
- Sugarcane and sugar beet: production, quality.
- Indigenous technology for small scale sugar production: *gur, khund, shakar*.
Raw sugar manufacturing: unit operations - juice extraction, purification, heating, evaporation, crystallization, crystallization in motion.
- Refining: affination, clarification, decolorisation, crystallization, centrifugation, drying, bagging, storage. Factors affecting sugar processing.
- Quality criteria: raw and refined sugar.
- Specialty sugar products: brown or soft sugar and liquid sugar.
- By-products of sugar industry and their efficient utilization.

Practical:

- Analysis of sugar cane, sugar beet for TSS, pH, fiber, ash and polarization.
- Extraction and clarifications of raw juice.
- Analysis of sugar and its intermediate products.
- Inversion of sugar.
- Visit to relevant industry.

Recommended Books:

1. Kay O'Donnell, Malcolm W. Kearsley, 2012, Sweeteners and sugar alternatives in food technology. Wiley-Blackwell.
2. Frederick Caras, 2019, Sugar: Processing, production and uses, Nova Science Publishers
3. Chen, J.C.P. 2013. Meade-Chen cane sugar handbook. John Wiley & Sons, Inc. New York, USA.