1. **FST 2202 FOOD PROCESSING AND PRESERVATION (3CU)**
2. COURSE INSTRUCTOR (S)
* Agnes Namutebi [BSc Food Science and Technology; MSc Food

Science; PhD Food Science, NottinghamUniversity – Carbohydrate Chemistry]

* Resource persons
* Guest lecturer
1. COURSE TYPE:
* Core course for Year 2 BSc. Food Science & Technology; Elective course for Year 2 BSc. Agribusiness Management
* Prerequisite knowledge: Food microbiology I and Food Chemistry I
1. COURSE STRUCTURE

Course is 3 credit units (3 CU): 2 lecture hours and 2 practical hours per week for 15 study weeks; [i.e. 30 lecture hours & 30 practical hours equivalent to 45 contact hours].

1. COURSE DESCRIPTION

An over view of food processing & food preservation, and associated food processing unit operations; Principles of food preservation methods such as temperature and water activity control, and effects of preservation methods on food quality of foods detailed; Pasteurization and the canning industry; Refrigeration and freezing - Refrigerants & compressors; Effects of chilling & freezing on food; Drying and Evaporation; Acidification and Fermentation; Extrusion technology; Chemical preservation; Food additives; Irradiation; aseptic processing.

1. COURSE OBJECTIVES

**General objective:**

To impart knowledge and skills on processing and preservation methods for wholesome food products.

**Specific objectives:**

1. To impart knowledge on the causes of food spoilage and methods of processing and preserving food
2. To identify & select processing equipment and preservation methods appropriate for specific foods
3. To describe the effects of preservation methods on the quality of food.
4. RECOMMENEDED REFERENCES

Core reading

1. Food Processing Technology Principles and Practice. Wood head Publishing Limited, CambridgeEngland. Fellows, P. J. 1988.

2. Food Science. 5th Edition. Chapman & Hall. Potter, N. N. & Hotchkiss, J. H. 1998.

Background reading

1. Food Processing Operations. 2nd & 3rd Vol. Westport, Connecticut. AVI Publishing Company Inc. Heid, J. L. & Joslyn, M. A. 1963.

2. Frozen Food Technology. Blackie Academic & Professional. London. Glasgow. Mallett, C. P. 1993.

1. COURSE CONTENT, METHODS OF INSTRUCTION, TOOLS AND

EQUIPMENT

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| **TOPIC No.** | **CONTENT (sub topics)** | **METHOD OF INSTRUCTION/ Time allocation** | **TOOLS/ Equipment needed** |
| 1. Overview to food processing
 | * Concept of food processing
* Food preservation and unit operations of food processing
* Practical 1: Food processing unit operations in the Food Processing Pilot Plant
 | • Lecture (2 hrs) • Tour of Pilot processing plant facility (2 hrs) | • Visual aids [LCD projector/ white board & BB markers] |
| 1. Overview to food processing
 | * State & types of food industries nationally & globally
* Assignment: Analyse the state of industries in specific developing countries
 | • Lecture (1 hr) • Group assignment & presentations | • Visual aids [LCD projector/ white board & BB markers] |
| 1. The role of preserving food to deter spoilage
 | * Recap on principle aspects of food microbiology & food chemistry
* Types of food spoilage
 | • Lecture (2 hr)  | • Visual aids [LCD projector/ white board & BB markers] |
| 1. Food preservation methods
 | * Water the driver of food spoilage
* Principles of food preservation methods
 | • Lectures (2 hrs) | • Visual aids [LCD projector/ white board & BB markers] |
| 1. Food preservation methods
 | * Based on temperature control (Heat preservation; Pasteurisation and Canning)
* Assignment: Calculate the D & Z values
* Practical 2: Thermal food processes at processing pilot plants, UIRI
* Practical 3: The Catalase Enzyme Test for Blanching
 | • Lectures (6 hrs)• Take-home assignment• Pilot processing plant practical (3 hrs)• Lab practical (3 hrs) | • Visual aids [LCD projector/ white board & BB markers]• Transport• Materials (Irish potato, Mushrooms) & reagents |
| 1. Food preservation methods
 | * Based on temperature control (Cold storage: Refrigeration & Freezing)
* Study visit: The types of freezers
 | • Lectures (4 hrs)• Fish industry visit (3 hrs) | • Visual aids [LCD projector/ white board & BB markers]• Transport to industry |
| 1. Food preservation methods
 | * Modifying water activity level/ content (Drying methods)
* Acidity and pH control
* Practical 4: Designs and Types of Solar dryers at Amfri Farm Ltd
* Practical 5: Effect of drying methods on carotenoid content of food.
 | • Lecture (3 hrs)• Lecture (1 hr)• Amfri Farm visit (3 hrs)• Lab plant practical (3 hrs) | • Visual aids [LCD projector/ white board & BB markers]; Handouts• Transport to industry• Chemical reagents• Food materials |
| 1. Food preservation methods
 | * Modifying water activity level/ content (Evaporation)
* Practical 6: Jam manufacture by open-pan method
 | • Lectures (1 hr)• Group presentation• Pilot processing plant practical (3 hrs) | • Visual aids [LCD projector/ white board & BB markers]• Materials & reagents |
| 1. Food preservation methods
 | * Use of chemical preservatives
 | • Lectures (2 hrs) | • Visual aids [LCD projector/ white board & BB markers]• Handouts |
| 1. Food preservation methods
 | * Use of micro-organisms/ enzymes in preserving food.
* Practical 7: Production of specified fermented products
 | • Lectures (1 hr)• Pilot processing plant practical (3 hrs) | • Visual aids [LCD projector/ white board & BB markers]• Handouts |
| 1. Food preservation methods
 | * Atmospheric composition control
 | • Lectures (1 hr) | • Visual aids [LCD projector/ white board & BB markers] |
| 1. Criterion for appropriateness of processing equipment
 | * Efficiency of food processing equipment
* Small & large scale food industries
 | • Lectures (2 hrs)• Reading& group assignment | • Visual aids [LCD projector/ white board & BB markers] |
| 1. Effects of preservation methods on quality of food
 | * Nutritional &

Organoleptic attributes* Assignment: Concept of hurdle technologies
 | • Lectures (1 hr)• Reading& group assignment | • Visual aids [LCD projector/ white board & BB markers]• Handouts |
| 1. Overview of other food processing methods
 | * Extrusion processing
* Irradiation
* Aspectic technology
* Microwave technology
* Practical 7: Smoking as a food preservation method
 | • Lecture (3 hrs) • Reading& group assignment• Pilot plant processing practical (3 hrs) | • Visual aids [LCD projector/ white board & BB markers]• Handouts• Meats , meat spices; Smoking material |
|  | * Mid-semester test
 | 2 hr | • Stationary: ream of paper & graph paper |

1. SUMMARY OF TIME NEEDED
* Lecture hours 30 hrs
* Laboratory hours 6 hrs
* Pilot processing plant hours 14 hrs
* Field/ industry learning visits 6 hrs
* Group presentations 4 hrs
1. OVERALL COURSE EVALUATION

Final exam 60%

Continuous assessment 40%

* Practical reports (10%)
* One mid semester test (10%)
* Quizzes (5%)
* Individual written assignments (5%)
* Group reports & presentations (10%)