1. **FST 2202 FOOD PROCESSING AND PRESERVATION**
2. *COURSE INSTRUCTOR (S)*

* *Agnes Namutebi [BSc Food Science and Technology; MSc Food*

*Science; PhD Food Science, Nottingham University – 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, Cambridge England. 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%)*