1. **FST 3103 SANITATION AND WASTE MANAGEMENT**
2. **COURSE INSTRUCTOR**

Mr. Andrew Mwebesa MUHAME [BSc. Agric. in Food Sc & Tech; MSc. Food Quality Management.]

1. **COURSE TYPE:**

Core course for Year 111 BSc. Food Science & Technology

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:**

Introduction to food plant sanitation, Principles of cleaning and sanitation, Types of sources of water for food processing, purification and treatment, waste disposal treatment, Low-Moisture food plant sanitation, Dairy processing plant sanitation, Meat & poultry plant sanitation, Sea food plant sanitation, fruit & vegetable plant sanitation, beverage sanitation, food service sanitation, Waste disposal and treatment, Biotechnological applications in waste treatment, Legislation and cost-benefit analysis in waste treatment, By-product utilization.

1. **COURSE OBJECTIVES**
* To provide sanitation information needed to ensure hygienic practices in food processing and preparation operations
* To develop a working knowledge in plant and equipment design and materials, cleaners and cleaning techniques, sanitizers, monitoring cleanliness, pests and their control, HACCP and personal hygiene
* To develop ability in selecting, establishing and maintaining a suitable program of sanitation
1. **RECOMMENEDED REFERENCES**
* Troller, J.A., 1993. Sanitation in Food Processing.—2nd ed. ACADEMIC PRESS, INC.
* Marriot, N.G. Essentials of Food Sanitation/ Robertson, G., Consulting editor. International Thomson Publishing
* Marriot, N.G., Gravani, R.B., 2006. Principles of Food Sanitation.—5th ed. Springer Science+ Business Media, Inc.
1. **COURSE CONTENT, METHODS OF INSTRUCTION, TOOLS AND**

**EQUIPMENT**

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| **TOPIC** | **CONTENT** | **METHOD OF INSTRUCTION/ Time allocation****(i.e. contact hours)** | **TOOLS/ Equipment needed** |
| 1. Introduction
 | * Common terms used in sanitation
* Role of sanitation in food plant
* Sources of contamination in a food plant
* Assignment (Individual take home)
 | -Interactive lectures (2 hrs) Practical (2 hours) | LCD projector/ BB/ White boards / Flip  |
| 1. Principles of cleaning and disinfection
 | * Methods of cleaning and practical applications
* Factors influencing cleaning
* Types of soil and cleaning compounds
* Handling and storage precautions of cleaning compounds
* Guided tour to DFST pilot plant for demonstration
 | -Interactive lectures (2hrs ) Practical (2 hours) | LCD projector/ BB/ White boards / Flip chartsPilot plant managerCleaning materials |
| 1. Water resources
 | * Types of sources of water for food processing, purification & treatment
* Water treatment methods
* Waste water components and analysis
* Microorganisms of importance in waste water treatment
* Field trip to National Water and Sewerage cooperation
 | -Interactive lectures (2 hrs) Practical (2 hours) | LCD projector/ BB/ White boards / Flip chartsTransport depending on the number of students-bottles of water for the field trip |
|  | * Microorganisms of importance in waste water treatment
* A case study related to waste water treatment
 | Case study analysis in form of group assignment- Practical (2 hours) | LCD projector/ BB/ White boards / Flip charts + a laptop computer |
| 1. Sanitary design and construction for food processing
 | * Site selection and preparation
* Building construction considerations
* Processing and design considerations
* Construction materials
* Pest control design
* Pilot plant demonstration on design of equipment
 | -Interactive lectures (2 hrs) Practical (2 hours) | LCD projector/ BB/ White boards Pilot plant manager |
| 1. Waste disposal and treatment
 | * Strategy of waste disposal
* Solid-waste disposal
* Liquid-waste disposal
* Industrial field trip to Mukwano industry
 | - Interactive lecture (2 hrs)Practical (2 hours) | LCD projector/ BB/ White boards / Flip chartsTransport for a defined number of students (approximately a 50 sitter bus) |
| 1. Mid semester evaluation
 | * Exam
 | (2 hrs) | Answer sheets |
| 1. Low –moisture food sanitation
 | * Sanitary design construction considerations
* Receipt and storage of raw materials
* Cleaning of Low-Moisture food manufacturing plants
 | -Interactive lecture (2 hrs)  | LCD projector/ BB/ White boards / Flip charts |
| 1. Dairy processing sanitation
 | * Major pathogens
* Plant construction
* Sanitation management
* Cleaning equipment
* Field trip to Uganda Dairy Cooperation
 | -Interactive lectures (2 hrs) Practical (3 hrs) Individual field report | LCD projector/ BB/ White boards / Flip chartsTransport ( approximately a 50 sitter bus or less depending on the number of students, packed water/juice + snacks |
| 1. Meat and poultry plant sanitation
* Sea food plant sanitation
 | * Common pathogens
* Sanitation management
* Sanitizers for meat & poultry plants
* Sources of sea food contamination
* An industrial trip to meat packers
 | -Interactive lectures (2hr) Practical ( 3 hours)Field report | LCD projector/ BB/ White boards / Flip chartsTransport ( approximately a 50 sitter bus or less depending on the number of students, packed water/juice + snacks |
| 1. Fruit and vegetable processing plant sanitation
 | * Plant construction
* Sanitation management
* Cleaning considerations
* Cleaning of fresh fruits in the pilot plant
 | -Interactive lectures (2 hrs) Practical (2 hours) | LCD projector/ BB/ White boards / Flip chartsFresh tomatoes, utensils |
| 1. Beverage sanitation
 | * Mycology of beverage manufacture
* Brewery and winery sanitation
* A trip to Uganda breweries
 | Interactive lectures (1 hr) Field report -Practical ( 2 hours) | LCD projector/ BB/ White boardsTransport ( a 50 sitter bus), water |
| 1. Food service sanitation
 | * Buying ingredients
* Receipt and storage of ingredients
* Group assignment presentations
 | Interactive lectures(1 hr)practical (2 hrs) | LCD projector/ BB/ White boards / Flip charts |
| 1. Application of Biotechnology principles

 in waste treatment | * Biosensors
* Bioremediation
* Genetically modified (an)aerobic bacteria
* Other biotechnology applications
* By-product utilization
* Individual Assignment
 | -interactive lectures(2 hrs)Practical (3 hours) | LCD projector/ BB/ White boards / Flip charts |
| 1. Legislation and cost-benefit analysis in waste management
 | * Total quality management
* Hazard Analysis Critical Control Points (HACCP)
* Development of a HACCP program
* Cost benefit mathematical models
* Individual assignment presentations
 | Interactive lecture (2 hrs)Practical (3 hours) | LCD projector/ BB/ White boards / Flip charts+ a laptop computer |
| 1. Management and Sanitation
 | * Management requirements
* Employee selection
* Total quality management
* Summary on the management of a sanitation program
 | Interactive lecture ( 2 hours) | LCD projector/ BB/ White boards / Flip charts |

1. **SUMMARY OF T IME (as contact hours) NEEDED**
* Lecture hours 30 hrs
* Practical hours 30 hrs
1. **OVERALL COURSE EVALUATION**
* Individual assignments and presentations 10%
* Group assignment and presentations 10%
* Field reports 05%
* Mid semester exam 15%
* Final exam 60%