

**College of Agriculture and Natural resources**

**Department of Horticulture**

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| **COURSE TITLE** | **PROCESSING OF FRUITS & VEGETABLES** |
| **COURSE CODE** | **HORT3172** |
| **CREDIT HOURS** | **2 (1+1) 3 ECTS** |
| **ACADEMIC YEAR** | **2008**  |
| **SEMESTER** | **II** |
| **INSTRUCTOR**  | **Mr. Sintayehu Musie (M.Sc.)** |

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| **ACTIVITY** | **TOTAL HOURS** |
| **LECTURE HOUR** | **16** |
| **TUTORS** | **4** |
| **LABORATORY/ FIELD WORK** | **48** |
| **HOME BASED ACTIVITIES/LIBRARY WORK**  | **32** |
| **TOTAL** | **100** |

1. **COURSE DESCRIPTION**

This course is designed to equip third year horticulture students with basics of processing and preservation of fruits and vegetables, present status and future prospects in Ethiopia. It also deals with deterioration factors and their control, general principles and methods of preservation, canning of fruits and vegetables. It will also equip student’s skills of preparing home-based fruits and vegetables products and promoting their utilization.

1. **COURSE OBJECTIVES**

**COURSE MAIN OBJECTIVES**

* At the end of this course students will be able to apply basic techniques of processing, preservation, value addition of fruit and vegetables and prepare different fruit and vegetable products.

**SUPPORTIVE OBJECTIVES:**

To achieve the main objective of the course the students will be able to:

* Describe the status and prospect of processing of fruit and vegetables in Ethiopia
* Differentiate deterioration factors of processed fruit and vegetable products
* Explain the scientific bases of processing and preservation of fruits and vegetables
* Describe different methods of processing and preservation techniques of fruits and vegetables
* Discuss effects of processing on nutrient content of a variety of foods
* Identify food contaminants at different points of processing
* Identify different canning materials of processed fruit and vegetables
* Explain enrichment techniques of family diet
* Prepare different home-based fruit and vegetable products
* Promote utilization of safe home-based fruit and vegetables products
1. **PREREQUISITES:** Postharvest physiology and handling of horticultural produces
2. **COURSE OUTLINE**

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| **Contents** | **Lecture hours** |
| **Chapter 1. Introduction** * 1. Definition of Processing
	2. Importance of processing
	3. Present status & prospects Fruit & vegetable processing in Ethiopia
	4. Planning for processing
		1. Types of fruits and vegetable for processing
		2. Selection of processing system
 | 2 |
| **Chapter 2. Deterioration factors and their control*** 1. Enzymatic change
	2. Chemical change
	3. Physical change
	4. Biological change
		1. Micro biological
		2. Macro biological
 | 6 |
| First Assessment |  |
| **Chapter 3. Principles & methods of preservation of fruits and vegetables** * 1. Physical method of preservation
		1. Application of heat - pasteurization, sterilization
		2. Removal of heat, Refrigeration, freezing etc.
		3. Drying
		4. Irradiation
	2. Chemical methods of preservation
		1. Salt
		2. Sugar
		3. Acid
	3. Food additives
	4. Preservation by fermentation
	5. Preservation by combination of different methods
 | 7 |
| **Chapter 4. Caning/Packaging/ for processed products*** 1. Requirements and functions of food containers
	2. Packaging materials
		1. **Films and foils; plastics**
		2. **Glass containers**
		3. **Paper packaging**
		4. **Tin can/tinplate**
	3. Canning
 | 8 |
| Second Assessment |  |
| **Chapter 5.** P**reservation of selected fruit and vegetables** * 1. Effect of Food Processing on nutrient content
	2. **Dehydrated fruits and vegetables**
		1. **Dried onion**
		2. **Dried tomatoes**
		3. **Dried banana**
		4. **Dried mango bars**
		5. **Mango slice**
		6. **Potato** chips
	3. **Tomato products**
		1. **Peeled Tomato**
		2. **Tomato paste/pulp**
		3. **Tomato juice**
		4. **Tomato** ketchup
	4. **Jam, jelly, marmalade**
	5. Minimal processing of fruits and vegetables
	6. **Fruit beverages**
	7. **Mixed** pickled vegetables
	8. Food fortification
 | 4 |
| Third assessment |  |
| Fourth assessment and Final exam |  |

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| 1. **DESCRIPTION TEACHING AND LEARNING METHODS**
* Discussion
* Interactive Lecturing
* Interactive Presentation
* Facilitated Practice
* Demonstration
* Study trip
1. **COURSE LOGISTICS**
* Location (Class room, laboratory/filed, nearby processing factories)
* Date : Wednesday
* Time: 8:00-9:40
1. **PRACTICAL SESSIONS** **PRACTICAL HRS**

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| Preparation of Mango Juice | 4 |
| Processing of French fries(chips) | 5 |
| Dehydration of Onion and Tomato  | 6 |
| Preparation of tomato products (ketchup & sauce)  | 8 |
| Preparation of jelly, jam, and marmalades | 12 |
| Canning of fruits and vegetable products  | 6 |
| Pickling of fruits and vegetables | 7 |

1. **DESCRIPTION OF ASSESSMENT METHODS**

Evaluation will be carried out based on continuous assessment Quizzes, Test, Presentation, Practical report, Term paper, Final Exam

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| **Assessment methods**  | **Allotted marks in %** | **Chapter**  |
| Written Exam* Test(2x)
* Final Exam
 | 20 | 1 & 2 |
| 40 | 3,4&5 |
| Group work assignment & presentation  | 10 | 3 |
| Practical report  | 10 | 3,4 & 5 |
| Observation of Practical work | 10 | 3, 4 & 5 |
| Assignment/term paper/& presentation | 10 | 2  |
| **Total**  | **100%** |  |
| **Grading:** Fixed  |  |

1. **COURSE POLICY**

All students are expected to abide by the code of conduct of students of the University throughout this course.Switch off Mobile Phones during any activity; chewing gum is forbidden; being late more than one minute is unacceptable; during lecture hours, noise is forbidden; in case of inconvenience, inform ahead of time.1. **DESCRIPTION OF TEACHING AND LEARNING MATERIALS**
* Hand out
* Laboratory manual
* Laboratory equipment
* Tomato, Mango, Papaya, Onion, Potato, Sweet Orange.
* Audiovisual
* Flip charts and markers

**REFERENCES** FAO.1980. **Roots, tubers, plantains and bananas in human nutrition. Rome.**Mitra, S.K., 2005. Postharvest physiology and storage of tropical and subtropical fruits. CAB International. India.Sudheer, K.P. and V. Indra, 2007. Postharvest Technology of Horticultural Crops. PitamPura, New Delhi-India.Wills, R.B.H., W.B. McGlasson, D. Graham, and D.C. Joice, 2007. Postharvest-An introduction to the physiology and handling of fruits, vegetables and ornamentals. 5th Ed. UNSW PRESS.  |