STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

BACHELOR OF VOCATIONAL (B.Voc.) PROGRAMME
FOOD PROCESSING AND QUALITY CONTROL

SYLLABUS
(Effective from the academic year 2016 – 2017)

FOOD MICROBIOLOGY WITH LABORATORY WORK

CODE:16VF/VM/FM16

CREDITS: 6
L T P: 3 0 3
TOTAL TEACHING HOURS: 78

OBJECTIVES OF THE COURSE

- To become aware of the Microorganism in Food and Environment
- To acquire knowledge about the aspects of interaction between Microorganism, Food borne illnesses and Food Fermentation

Theory **(39hrs.)**

Unit 1 **(5hrs.)**

Introduction

1.1 Introduction to Microbiology
1.2 General Characters of Bacteria, Fungi, Virus, Protozoa and Algae

Unit 2 **(9hrs.)**

Microbial Growth

2.1 Growth curve of Bacteria
2.2 Effect of Environmental Factors on Growth of Microorganism : pH, Water activity, Oxygen availability and Temperature
2.3 Perishable, Semi-Perishable Food, Shelf life and Stable Food

Unit 3 **(9hrs.)**

Microbial Food Spoilage

3.1 Spoilage Microorganism in Cereals (Rice, Maize, Wheat, Millet), Pulses, Milk, Meat, Fish and Egg
3.2 Physical and Chemical Changes caused by Microorganism during Spoilage

Unit 4 **(9hrs.)**

Food Borne Diseases

4.1 Types : Food borne infections, Food borne Intoxication and Toxic Infections
4.2 Origin, Symptoms and Prevention of Food Borne Diseases
4.3 Site of Food Borne Illness – The Alimentary Tract its function and Microflora
4.4 Emerging Pathogens of concern and Risk factors associated with food borne illness (case study)

Unit 5 **(7hrs.)**

Fermented and Microbial Food

5.1 Principles of Fermentation

5.2 Lactic acid Bacteria (LAB) in Food

5.3 Health promoting microorganisms – Probiotics and Prebiotics

Laboratory Work **(39hrs.)**

1. Introduction to Basic Microbiological Equipments

Autoclave-Inoculation Chamber-Laminar Air Flow-Hot air Oven-Water Bath-Incubator and Colony Counter-Colorimeter

2. Culture Techniques

Preparation of Media-Serial dilution-Pour plate, Streak plate, Slant, Loop, Stab and Spread Plate

3. Staining Techniques

Gram Staining for bacteria-Lacto Phenol Staining Technique for Fungi-Staining Technique for Yeast

4. Identification of Micro Organism

Basic Steps in Detecting Food Pathogens-Identification of important Food Borne Fungi and Bacteria-Morphological Study of Bacteria and Fungi

5. Microbial Analysis of Water

Coliform Test-Presumptive Test-Confirmatory Test-Completed Test- Membrane Filter Technique

TEXT BOOK

Betty. C. Hobbs Arnold. *Food Microbiology.* New Delhi: Heinenann Publisher, 1982

BOOKS FOR REFERENCE

Adgms. M.R. and M.O. Moss. *Food Microbiology.* New Delhi: Panima Publishing Corporation, 2003

Banwart. G.J. *Basic Food Microbiology,* S.K. Jain for CBS Publishers and Distributors, 1974.

Frazier. C. and West Hoff. D.C. *Food Microbiology,* India: McGraw-Hill Pub. Co., Ltd., 1987

Jay. J.M. *Modern Food Microbiology,* S.K. Jain for CBS Publishers and Distributors, 1987

Parry. T.J. and Pawsey. R.K. *Principles of Microbiology,* Hutchinson and Co. 1984

Patel. A. H. *Industrial Microbiology,* New Delhi*:* Macmillan India Ltd. 1984

Sharad Srivastava and Vineeta singhal. *Food Microbiology*, New Delhi: Anmol Publishing Pvt., Ltd., 1997

Stains and Buffers. *Handbook of Laboratory, Culture, Media, reagents,* 2003

PATTERN OF EVALUATION

Continuous Assessment: 25 marks **End Semester: 75 marks**

The students will be taking one C.A. test and additional Skill sets training practical component which may include practical work, assignments, project work, any other.

I. C.A. Test for 3 hours **50 marks**, comprising of Theory (25marks) and Practical (25marks), both to be done in the laboratory. **The final marks to be converted to 25**
C.A. Test Pattern for theory: (25marks)
Section A – Objective/ definition/ fill in the blanks- 10 x 1 = 10 marks (to be collected after 10 minutes)
Section B – 3 out of 5 – 3 x 3 = 9 marks
Section C – 1 out of 2 – 1 x 6 = 6 marks
Practical: 25 marks
II. Continuous Assessment of Skill sets training - practical work: **25 marks** – Aggregate of all practical assessment

End Semester Examination (Total 100 marks to be converted to 75 marks)

Total Marks: 100 Duration: 5 hours

Theory: 50 Marks Practical: 50 Marks

(Both theory and practical to be done in the laboratory).

Pattern for Theory: 50 marks

Section A – Objective/ definition/ fill in the blanks- 20 x 1=20 marks (to be collected at the end of 20 minutes)
Section B – 6 out of 10 - 6 x 3 = 18 marks
Section C – 2 out of 4 - 2 x 6 = 12 marks
Practical: 50 marks

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

BACHELOR OF VOCATIONAL (B.Voc.) PROGRAMME
FOOD PROCESSING AND QUALITY CONTROL

SYLLABUS
(Effective from the academic year 2016 – 2017)

TECHNOLOGY OF FRUITS AND VEGETABLES PROCESSING – HANDS ON TRAINING

CODE:16VF/VM/FV16

CREDITS: 6
L T P: 3 0 3
TOTAL TEACHING HOURS: 78

OBJECTIVE OF THE COURSE

- To acquaint students with principles and methods of preservation and processing of fruits and vegetables into various products
- To get hands on experience on processing of fruit and vegetables

Theory **(39hrs.)**

Unit 1 **(7hrs.)**

Introduction

1.1 Classification and composition of Fruits and Vegetables
1.2 Indian and global scenario on production and processing of fruits and vegetables
1.3 Quality requirements of raw materials for processing ; sourcing and receiving at processing plants; primary processing: grading, sorting, cleaning, washing, peeling, slicing and blanching; minimal processing

Unit 2 **(8hrs.)**

Fruit and Vegetable Processing - I

2.1 Processing for Pulp puree and concentrate, especially from Mango, Tomato, Guava, Papaya, Apple, Pineapple, Pomegranate, Grapes, using aseptic packaging
2.2 Frozen Fruits and Vegetables, Individual Quick Freezing (I.Q.F.)

Unit 3 **(8hrs.)**

Fruit and Vegetable Processing - II

3.1 Store management, inventory management, safety measures – fire extinguisher, first aid kit
3.2 Process management, Process flow design planning , execution and post production processes
3.3 Principle and process of Canning

Unit 4 **(8hrs.)**

Fruit and Vegetable Processing - III

4.1 Dehydration of Fruits and Vegetables using various drying technologies like sun drying, solar drying (natural and forced convection), osmotic, tunnel drying, fluidized fed drying, freeze drying, convectional and adiabatic drying

4.2 Applications to raisins, dried figs, vegetables, intermediate moisture Fruits and Vegetables

4.3 Drying of Fruits and Vegetables

Unit 5 **(8hrs.)**

Fermented Fruit Beverages

5.1 Principles of fermentation

5.2 Preparation of Grape wine and Vinegar

5.3 Principle, Chemistry and Preparation of Pectin

Laboratory Work **(39hrs.)**

1 Preparation of Jam, Jelly and Marmalade
Mixed Fruit Jam-Guava Jelly-Orange Marmalade

2 Preparation of Syrups, Crushes and Squashes
Lime Syrup-Grape Crush-Mango Squash (Optional)-Pineapple Syrup

3 Preparation of Preserves and Candies
Ginger Preserve-Tutti-frutti-Raisin

4 **Preparation of Ketchup and Pickle**
Tomato ketchup**,** Lime Pickle-Mixed Vegetable Pickle-Cider

5 Drying and Canning
Drying of Fruits and Vegetables-Banana-Peas-
Canning-Pineapple-Beans and Carrot

Visit to Food Processing Industries

TEXT BOOKS

Frazier, W.C. and West Hoff, D.C. *Food Microbiology (4th ed.),* New Delhi: Tata McGrawhill Publishing Co., Ltd., 1995

Lal, G., Siddappa, G.S. and Tandon, G.L, *Preservation of Fruits and Vegetables,* New Delhi: Indian Council of Agricultural Research, 1998

BOOKS FOR REFERENCE

Frazier. W.C. and West Hoff. D.C. *Food Microbiology (4th ed.),* New Delhi: Tata McGrawhill Publishing Co., Ltd., 1995

Kulshrestha. S.K. *Food Preservation,* New Delhi: Vikas Publishing House, 1994

Lal, G. Siddappa, G.S. and Tandon. G.L. *Preservation of Fruits and Vegetables,* New Delhi: Indian Council of Agricultural Research, 1998

Blank, F.C., *Handbook of Food and Nutrition,* India: Agrobios Publishers, 2000

Home Scale – *Processing and Preservation Fruits and Vegetables,* India: Central Food Technological Research Institute, 1996.

Patel, A. H., *Industrial Microbiology,* New Delhi: Macmillan India Ltd., 1984

Prescott and Dunn's, *Industrial Microbiology,* U.S.A.: The AVI Publishing Co. Inc., 1987

Swaminathan, M., *Handbook of Food Science and Experimental Foods,* Bangalore: The Bangalore Printing and Publishing Co., Ltd., 1992

PATTERN OF EVALUATION

Continuous Assessment: 25 marks **End Semester: 75 marks**

The students will be taking one C.A. test and additional Skill sets training practical component which may include practical work, assignments, project work, any other.

I. C.A. Test for 3 hours **50 marks**, comprising of Theory (25marks) and Practical (25marks), both to be done in the laboratory. **The final marks to be converted to 25**
C.A. Test Pattern for theory: (25marks)
Section A - Objective/ definition/ fill in the blanks - 10 x 1=10 marks (to be collected after 10 minutes)
Section B - 3 out of 5 - 3x3 = 9 marks
Section C - 1 out of 2 - 1x6=6 marks
Practical: 25 marks

II. Continuous Assessment of Skill sets training - practical work: **25 marks** – Aggregate of all practical assessment

End Semester Examination (Total 100 marks to be converted to 75 marks)

Total Marks: 100 Duration: 5 hours

Theory: 50 Marks Practical: 50 Marks

(Both theory and practical to be done in the laboratory).

Pattern for Theory: 50 marks

Section A – Objective/ definition/ fill in the blanks- 20 x 1=20 marks (to be collected at the end of 20 minutes)

Section B – 6 out of 10 – 6 x 3 = 18 marks

Section C – 2 out of 4 – 2 x 6 = 12 marks

Practical: 50 marks

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

BACHELOR OF VOCATIONAL (B.Voc.) PROGRAMME
FOOD PROCESSING AND QUALITY CONTROL

SYLLABUS
(Effective from the academic year 2016 – 2017)

FOOD HYGIENE AND SANITATION

CODE:16VF/VA/HS 15

CREDITS: 5
L T P: 4 0 1
TOTAL TEACHING HOURS: 65

OBJECTIVES OF THE COURSE

- To highlight the importance of Hygiene and Sanitation in Food Industry
- To provide knowledge relating to the Significance of Pest Control

Unit 1 **(8hrs.)**

Cleaning Procedures

1.1 Introduction to food hygiene, Cleaning and Sanitizing
1.2 Cleaning of premises and surroundings
1.3 Guidelines and Types of Cleaning Equipment
1.4 Location, Layout and Construction of Premises

Unit 2 **(8hrs.)**

Personal Hygiene

2.1 Importance of Personal Hygiene of Food handler – habits – clothes, illness
2.2 Education for Food handler – practical approach

Unit 3 **(12hrs.)**

Pest Control and Disposal of Waste

3.1 Importance of Pest Control
3.2 Classification of Pests
3.3 Use of Pesticide
3.4 Waste Product handling (Solid and Liquid Waste)
3.5 Storage of grain and its importance
3.6 Storage structure, tradition modern and underground
3.7 Role of PDS, FCI, IGSI, SGC in Controlling Food Losses

Unit 4 **(12hrs.)**

Safety at the Work Place

4.1 Sanitation Training and Education
4.2 Steps in Planning and implementing a Training Programme

4.3 Types of Accidents and their Effect
4.4 Safety instruction in food industry
4.5 Process flow design

Unit 5 (12hrs.)

Food Service Hygiene

5.1 Rules of food service
5.2 Protective display of foods
5.3 Hygiene in Street foods, restaurants and Quick Serve Restaurants

Group projects (13hrs.)

TEXT BOOK

Sunetra Roday. II edition. *Food Hygiene and Sanitation with Case Studies.* New Delhi: Tata McGraw Hill Education Pvt., Ltd., 2012

BOOKS FOR REFERENCE

Hobbs. B.C. and Gilbert. R..J. *Food Poisoning and Food Hygiene.* New York: The English Language Book Society and Edward Arnold Publishers Limited, 1978

Jacob. M. *Safe Food Handling*, Geneva: A training guide for Manager, WHO, 1989

James M. Jay. *Modern Food Microbiology*, New Delhi: CBS Publishers, 1996

Norman G. Marriot. *Principles of Food Sanitation*, Connecticut: AVI Publishing Co., Inc., 1989

PATTERN OF EVALUATION

Continuous Assessment: 25 marks **End Semester: 75 marks**

The students will be taking one C.A. test and additional Skill sets training practical component which may include practical work, assignments, project work, any other.

I. C.A. Test for 2 hours **50 marks**, comprising of Theory (35 marks) and Practical (15 marks), both to be done in the laboratory

Theory: 35 marks

C.A. Test Pattern:

Section A – Objective/ definition/ fill in the blanks- 10x1=10 marks (to be collected after 10 minutes)

Section B – 2 out of 4 – 2 x 5 = 10 marks

Section C – 1 out of 2 – 1 x 15=15 marks

Practical: 15 marks

II. Continuous skill sets training practical work, Assignment, Quiz etc.: **25 marks**

End Semester Examination (Total 100 marks to be converted to 75 marks)

Total Marks: 100 Duration: 3 hours

Theory: 75Marks Practical: 25 Marks

(Both theory and practical to be done in the laboratory).

Pattern for Theory: 75 marks

Section A – Objective/ definition/ fill in the blanks - 20 x 1 = 20 marks (to be collected after 20 minutes)
Section B – 5 out of 7 – 5 x 5 = 25 marks
Section C – 2 out of 4 – 2 x15 =30 marks

Practical: 25 marks