

# **SHIVAJI UNIVERSITY, KOLHAPUR.**



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Accredited By NAAC with 'A' Grade

**CHOICE BASED CREDIT SYSTEM**

Syllabus For

**B.Sc. Part - I  
Food Science & Quality Control**

**SEMESTER I AND II**

**(Syllabus to be implemented from June, 2018 onwards.)**

**Proposed scheme for Choice based Credit System B.Sc. with  
Food Science & Quality Control**

<b>Sem</b>	<b>Core Course (12)</b>	<b>Ability Enhancement Compulsory Course(AECC)(2)</b>	<b>Skill Enhancement Course(SEC)(2)</b>	<b>Discipline Specific Elective (DSE)(6)</b>
I	Food Chemistry-I	(English/ MIL Communication)/ Environmental Science		
	Food Microbiology- I			
	DSC-A			
	DSC-A			
	DSC-A			
II	Food Chemistry-II	(English/ MIL Communication)/ Environmental Science	SEC-1	
	Food Microbiology- II			
	DSC-B			
	DSC-B		SEC-2	
	DSC-B			

### B.Sc. with Food Science & Quality Control - Scheme of examination.

Semester	Course opted	Course Name	Credits
I	Ability Enhancement Compulsory Course-1	(English/ MIL Communication)/ Environmental Science	2
	DSC-33A	Food Chemistry-I	2
	DSC-34A	Food Microbiology-I	2
	Core Course Practical/Tutorial	Practicals	2
II	Ability Enhancement Compulsory Course-2	(English/ MIL Communication)/ Environmental Science	2
	DSC-33B	Food chemistry-II	2
	DSC-34B	Food Microbiology -II	2
	Core Course Practical/Tutorial	Practicals	2

#### **B.Sc. Food Science & Quality Control**

**Core papers Food Science & Quality Control .Credit: 2(T)+2(T)+2(P)**

1. DSC-33A Food Chemistry-I (02)
2. DSC-34A Food Microbiology-I (02)
3. DSC-33B Food chemistry-II (02)
4. DSC-34B Food Microbiology-II (02)

# Semester I

## DSC-33A: Food Chemistry-I

**(2 Credits Theory)**

**Theory 60 lectures**

**Theory**

**Objectives**

- To understand the chemistry of foods-composition of food, role of each component and their interaction.
- To understand the functional aspects of food components and to study their role in food processing.

**Contents**

### **Unit 1. Introduction to Food Chemistry (1lecture)**

- Definition
- Composition of food

### **Unit 2 Water (8 Lectures)**

- Definition of water in food
- Structure of water
- Types of water
- Water activity & shelf life.

### **Unit 3 Lipids (9 lectures)**

- Classification of lipid
- Physical property- melting point, softening point, specific gravity, refractive index
- Chemical properties-Iodine value, peroxide value, saponification value
- Effect of frying on fats
- Changes in fats & oil- Rancidity, Lipolysis, Flavour reversion.
- Auto-oxidation & its prevention.
- Technology of edible fats & oil- Refining, hydrogenation & interesterification

### **Unit 4 Protein (10 lectures)**

- Protein classification & structure
- Nature of food protein ( plants& animal Protein)
- Properties of protein( Electrophoresis, Denaturation)
- Functional properties ( solubility,gelation,emulsification,foaming.

## **DSC-34A: Food Microbiology-I (2Credits )**

### **Theory**

#### **Objective:**

- To know importance genera of microorganisms associated with food & their characteristics
- To understand the role of microbes in fermentation , spoilage & food born diseases

### **Contents**

#### **Unit 1: Introduction to Food Microbiology (5 Lectures)**

- History & development of food microbiology
- Definition & scope of microbiology
- Importance of microbiology in food

#### **Unit 2: Characteristics of microorganisms in food (7 Lectures)**

- Types of microorganisms associated with food
- Morphology & structure of microorganisms
- Factors affecting the growth of microorganisms

#### **Unit 3: Culture media & staining techniques (8 lectures)**

- Common Components of media & their functions
- Types of media- living, nonliving
- Classification of stains- acidic, basic & neutral
- Staining procedure-Simple, negative, Gram & differential.

#### **Unit 4: Microbial food spoilage (8Lectures)**

- Source of microorganisms in food
- Important food spoilage microorganisms.
- Spoilage of specific food groups-milk & dairy products, meat, poultry & sea food, cereal & cereal products, fruits, vegetable & canned products.

## **Practicals (2Credits)**

### **Contents:**

1. Preparation of primary solutions
2. Determination of pH of fruit juice samples
3. Determination of hardness of water
4. Estimation of moisture content
5. Isolation of starch from potato
6. Isolation of Casein from milk.
7. Determination of gelatinization temperature range (GTR) of different starches.
8. Introduction to microbiological instruments.
9. Study of compound microscope.
10. Cleaning & sterilization of glass wares
11. Preparation & sterilization of Nutrient broth.
12. Cultivation & sub-culturing of microbes.
13. Preparation of slant, plates using nutrient agar
14. Morphological study of bacteria & fungi using permanent slides.

### **Recommended books:**

1. Fennema, Owen R, Food chemistry, 3<sup>rd</sup> edition Marcell Dekker, New York 1996
2. DeMan, J.M., Principle of food chemistry AVI, New York, 1980
3. Potter, N.N. & Hotchkiss, J.H., Food Science, 5<sup>th</sup>, Chapman & Hall, 1995
4. H. Thapar, Food Chemistry 1<sup>st</sup> edition Pacific books international 2011
5. Frazier William C & Westhoff, Dennis C. Food Microbiology, TMH, New Delhi, 2004.
6. Jay, James M. Modern Food Microbiology, CBS Publication, New Delhi, 2000
7. Pelczar MJ, Chan E.C.S & Krieg, Noel R. microbiology, 5<sup>th</sup> Edition, TMH, New Delhi 1993
8. S. Jadhav, Textbook of microbiology, 2<sup>nd</sup> edition, Mehta Publications Pune, 2000

## **Semester II**

### **DSC-33B: Food Chemistry-II (2 Credits Theory)**

#### **Theory 60 lectures**

#### **Theory**

##### **Unit 1 Carbohydrates (9 lectures)**

- Classification of Carbohydrates
- Structures of important polysaccharides
- Chemical reaction of Carbohydrates-oxidation, reduction, with acid & alkali.
- Modified Cellulose & Starches

##### **Unit 2 Vitamins (7 lectures)**

- Definition & classification
- Structure, importance & stability
- Water soluble vitamins & their sources
- Fat soluble vitamins & their sources

##### **Unit 3 Minerals (6 Lectures)**

- Definition
- Classification of minerals
- Sources & deficiency of minerals
- Toxic minerals.

##### **Unit 4 Flavour (6 Lecture)**

- Definition & basic tastes
- Chemical structure & taste
- Description of food flavour
- Flavour Enhancer

## **DSC-34B: Food Microbiology-II (2Credits )**

### **Theory**

#### **Unit 1: Food born disease (8Lectures)**

- Definition
- Food born infection
- Food born intoxication
- Prevention of food born diseases

#### **Unit 2: Cultivation of microorganisms (7 Lecture)**

- Pure Culture techniques
- Method of isolation & cultivation
- Enumeration of microorganisms- Qualitative & Quantitative

#### **Unit 3: Control of microorganisms in food (8 Lecture)**

- Principle & method of preservation
- Physical method of food preservation- High temperature & low temperature.
- Biopreservatives esp. Bacteriocin

#### **Unit 4:Food Fermentation ( 5Lectures)**

- Definition
- Microorganisms used in food fermentation.
- Fermented foods.



## **Practicals (2Credits)**

1. Determination of percentage of free fatty acid.
2. Estimation of Saponification value
3. Estimation of reducing sugar by DNSA method.
4. Estimation of protein by Biuret method.
5. Estimation of vitamin C by DCPIP method.
6. Estimation of total Ash content.
7. Determination of boiling point of water.
8. Simple staining
9. Gram's staining
10. Standard plate count method.
11. Preparation of curd.
12. Preparation of idli.
13. Identification of spoiled food samples.
14. Microbial sampling of air- indoor & outdoor

## **Recommended books:**

1. Syed Iqbal & N. Labal, Advanced Food Chemistry 1<sup>st</sup> edition, New Delhi, 2011
2. Dr. P. Shrivastva & Dr. A. Swarup Food Chemistry, 1<sup>st</sup> edition, New Delhi, 2014
3. N. Shakuntala Manay & M. Shadaksharaswamy, Foods Facts & Principles, 3<sup>rd</sup> edition  
New Delhi, 2008
4. Sunetra Roday, Food Science & Nutrition, New Delhi, 2009
5. K. Buggal, Introduction to Food microbiology, 1<sup>st</sup> edition, Cyber tech publication, 2011
6. Dr. Sharath C. Patil & Dr. Naidu, Food Microbiology, 1<sup>st</sup> edition Campus book  
publication, 2010
7. Dr. P. Shrivastva & Dr. A. Swarup Food & Microorganisms, 1<sup>st</sup> edition, New Delhi, 2014