

**SYLLABUS FOR SIX SEMESTERS**  
**BACHELOR OF SCIENCE (B.Sc.) DEGREE**  
**PROGRAMME IN THE SUBJECT OF FOOD SCIENCE &**  
**QUALITY CONTROL**  
**FROM YEAR 2014**

## Semester-wise distribution of courses and credits

**Subject : FOOD SCIENCE AND QUALITY CONTROL**

**Subject Code: FS**

### **Semester I**

Course code	Credits	Contact hrs per week L-T-P
FS 101(T)	4	4-0-0
FS 101(P)	2	0-0-3
	TOTAL	4-0-3

L- number of lectures, T- Number of Tutorials, P- Number of Practicals' hours

### **Semester II**

Course code	Credits	Contact hrs per week L-T-P
FS 201(T)	4	4-0-0
FS 201(P)	2	0-0-3
	TOTAL	4-0-3

### **Semester III**

Course code	Credits	Contact hrs per week L-T-P
FS 301(T)	4	4-0-0
FS 301(P)	2	0-0-3
	TOTAL	4-0-3

### **Semester IV**

Course code	Credits	Contact hrs per week L-T-P
FS 401(T)	4	4-0-0
FS 401(P)	2	0-0-3
	TOTAL	4-0-3

**Semester-V**

Course code	Credits	Contact hrs per week L-T-P
FS 501(T)	4	4-0-0
FS 501(P)	2	0-0-3
	TOTAL	4-0-3

**Semester-VI**

Course code	Credits	Contact hrs per week L-T-P
FS 601(T)	4	4-0-0
FS 601(P)	2	0-0-3
	TOTAL	4-0-3

**B.Sc. Food Science and Quality Control (Semester I)**

***BASIC NUTRITION & FOOD CHEMISTRY***

**Duration of Examination: 3hrs**

**Course code: FS 101(T)**

**Credits: 4(4hrs. per week)**

**Max marks = 100**

**External assessment =80**

**Internal assessment = 20**

**Syllabus for Examination to be held in the year 2014, 2015 & 2016**

**OBJECTIVES:**

To enable the students to:

- a) Understand the relationship between nutrition and human well being.
- b) Know and understand the functions, importance of all nutrients for different age groups and special groups
- c) To know the major and minor components of foods.
- d) To know composition and properties of food.

**UNIT – I**

1. Introduction to nutrition –functions of foods, definition of nutrition, nutrients, adequate optimum and good nutrition, malnutrition. Food as a source of nutrients.
2. Inter relationship between nutrition and health, visible symptoms of good health.
3. Food guide-basic five food groups and usage of food guide.
4. Use of food in body-digestion, absorption, transport, utilization of nutrients in the body.

**UNIT – II**

1. Water as a nutrient, function, sources, requirement, structure, water balance – effect of deficiency.
2. Introduction to chemistry of water and ice.
3. Moisture in food: Hydrogen bonding, Bound water, Free water, Water activity and Food stability.

4. Energy – Unit of energy, food as a source of energy, energy value of food, the body's need for energy, B.M.R. activities. Utilization of food for energy requirements
5. Acid – base balance.

### **UNIT – III**

1. Carbohydrates- composition, classification, sources, functions, structure, physical & chemical properties.
2. Other sweetening agents, functions of sugar in food (Browning reaction), changes during cooking and processing.
3. Lipids – composition, nomenclature, saturated, unsaturated fatty acids, classification, food sources, functions of fats.
4. Physical and chemical properties, emulsions, chemistry & technology of fat and oil processing. Role of food lipids in flavor
5. Proteins – composition, classification sources, functions, denaturation, and protein deficiency, determination of protein quality.
6. Amino acids – classification, Physio-chemical properties, modification of food protein through processing and storage.

### **UNIT – IV**

1. Mineral functions, sources, Bio-availability, and deficiency of following minerals – calcium, Iron, Iodine, Fluorine, sodium, potassium.
2. Vitamins – Classification, units of measurement, sources, functions and deficiency diseases caused by following vitamins:  
  
Fats soluble vitamins – Vitamin A, D, E and K  
  
Water soluble vitamins – Vitamin C and B-complex
3. Vitamins and minerals structure general causes of loss in food. Fortifications, Enrichment and Restoration.

### **UNIT – V**

1. Enzymes. Nomenclature, specificity, catalytic regulations, kinetics factors influencing enzyme activity, controlling enzyme action. Enzyme added to food during processing, modification of food by endogenous enzyme. Enzyme inhibitors in food.

2. Pigments indigenous to food, structure, chemical and physical properties. Effect of processing and storage.
3. Flavours – Vegetables, fruit and spice flavours, fermented food, Meat and sea food.

***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12x5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

**Distribution of Internal Assessment (20 Marks)**

20 marks for theory paper in a subject reserved for internal assessment shall be distributed as under:

- |      |   |                               |
|------|---|-------------------------------|
| (i)  | Class Test                                  | : 10 marks                    |
| (ii) | Two Written Assignments/<br>Project reports | : 10 marks<br>(05 marks each) |

## PRACTICALS

### B.Sc. Food Science and Quality Control (Semester I)

#### *BASIC NUTRITION & FOOD CHEMISTRY*

**Duration of Examination: 3hrs**

**Course code: FS 101(P)**

**Credits: 4(4hrs. per week)**

**Max marks = 50**

**External assessment =25**

**Internal assessment = 25**

**Syllabus for Examination to be held in the year 2014, 2015 & 2016**

1. Experiments on properties of monosaccharides- Glucose,Fructose and Galatose
2. Experiments on properties of Disaccharides - maltose,lactose and sucrose.
3. Experiments on properties of Polysaccharides -starch
4. Estimation of glucose in a given sample.
5. Experiments on properties of amino-acids.
6. Experiments on properties of proteins
7. Experiments on properties of fats.
8. Saponification number of lipids.

#### **Note for internal assessment (Total Marks: 25)**

50% of the total marks for the practical paper in a subject reserved for internal assessment shall be distributed as under:

1. 40% for the class assessments and tests and
2. 10% for regularity of attendance

#### **REFERENCES:**

1. Damodran, S., Parkin, K.L and Fennema, D.R. (2007). Fennema's Food Chemistry. 4<sup>th</sup> edition. CRC Press.
2. Guthrie, H.A. (1983). Introductory nutrition. 5<sup>th</sup> Edition. Mosby, St. Louis.
3. Meyer, L.H. (2004). Food Chemistry. Textbook Publishers. ISBN: 0758149204.
4. Mudambi, S.R., Rao, S.M. and Rajagopal, M.V.(2006). Food science. 2<sup>nd</sup> Edition. New Age International publishers.

5. Mudambi, S.R and Rajgopal, M.V. (2001). Fundamentals of Foods and Nutrition. 4<sup>th</sup> Edition. new Age International Publishers.
6. Shakuntla, M.N and Shadaksharaswamy, M. (2013). Food Facts and Principles. New Age International.
7. Srilakshmi, B. Food science. 3<sup>rd</sup> Edition. NewAge International.
8. Swaminathan, M. (2012). Advanced Text book on food and Nutrition, Vol. II. The Bangalore Printing And.
9. Swaminathan, M. (2012). Handbook of Food & Nutrition. 5<sup>th</sup> Edition. Bangalore printing.
10. Willson, D. (1999). Evan Principles of Nutrition. 4th Edition. John Willey & Sons: New York.



**B.Sc. Food Science and Quality Control (Semester II)**

***FOOD MICROBIOLOGY, SANITATION AND HYGIENE***

**Duration of Examination: 3hrs**

**Course code: FS 201(T)**

**Credits: 4(4hrs. per week)**

**Max marks = 100**

**External assessment =80**

**Internal assessment = 20**

**Syllabus for Examination to be held in the year 2015, 2016 & 2017**

**OBJECTIVES:**

To help the students to

- a) Acquire an elementary knowledge about micro-organism.
- b) To develop an understanding of the role of microorganisms in environment, Industry and in maintenance of health.
- c) Understand the importance of safe handling of food.

**UNIT – I**

1. Introduction to microbiology and its relevance to everyday life-General morphology of micro-organisms – General characteristics of bacteria, fungi, virus, protozoa, algae.
2. The relationship of micro-organism to sanitation. Role of microbiology-Environment effects of microbial growth.
3. Effects of micro-organisms on food degradation and food bore illness – Bacteria, Virus, Molds, Yeasts and parasites.

**UNIT – II**

1. Control of macro-organisms growth curve – Effect of environmental factors on growth of micro organisms-pH, water activity – oxygen availability, temperature & others.
2. Microbial intoxications and infections – sources of contamination of foods toxic production and physiological action. Sources of infection of foods by pathogenic organisms, symptoms and method of control.
3. Beneficial effect of micro-organisms.
4. Relevance of microbiological standards for food safety.

### **UNIT – III**

1. Microbiology of different foods – Spoilage and contamination- Sources, types, effects on the following:
  - a) Cereals & Cereals products.
  - b) Sugar & Sugar products.
  - c) Vegetables & Fruits.
  - d) Meat & Meat products.
  - e) Fish & other sea foods.
  - f) Eggs & Poultry.
  - g) Milk & Milk products.
  - h) Canned and other processed foods.
2. Other food hazards – chemicals, antibiotics, hormones, metals contamination – poisonous foods.
3. Food contamination – sources and transmission by water, air, sewage and soil as reservoirs of infection and mode of spread.
4. Other agents of contamination:  
Human, domestic animals, vermins, birds.

### **UNIT – IV**

1. Needed environment microbiology- water, air, soil & sewage.
2. Importance of personal hygiene of food handlers – clothes, illness. Education of food handler in handling and serving food
3. Safety in food procurement, storage, handling and preparation – control of spoilage – safety of left over foods.
4. Cleaning and sanitization. Products and methods – use of detergents and chemicals, tests for sanitiser's strength.

### **UNIT – V**

1. Kitchen Sanitation:
  - Kitchen design-equipment and systems.
  - Structure and layout of food premises maintaining clean environment.
  - Selecting and Installing cleaning equipment.

2. Waste product handling: Planning for waste disposal. Solid waste and liquid waste.
3. Control of infestation:  
Rodent Control – Rats, Mice-Rodent,, proofing, destruction, Vector Control. Uses of pesticides.
4. Food Sanitation, Control and Inspection – Planning and implementation of training programmes for health personnel.

***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12x5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

**Distribution of Internal Assessment (20 Marks)**

20 marks for theory paper in a subject reserved for internal assessment shall be distributed as under:

- |      |   |                               |
|------|---|-------------------------------|
| (i)  | Class Test                                  | : 10 marks                    |
| (ii) | Two Written Assignments/<br>Project reports | : 10 marks<br>(05 marks each) |

## **PRACTICALS**

### **B.Sc. Food Science and Quality Control (Semester II)**

#### ***FOOD MICROBIOLOGY, SANITATION AND HYGIENE***

**Duration of Examination: 3hrs**

**Course code: FS 201(P)**

**Credits: 2(3hrs. per week)**

**Max marks = 50**

**External assessment =25**

**Internal assessment = 25**

#### **Syllabus for Examination to be held in the year 2015, 2016 & 2017**

1. Microscope and its parts. Examination under low power/high power and oil immersion objectives.
2. Gram staining, Isolation and Identification.
3. Zheil-Nelsch staining.
4. Examination of yeasts, mould and non-pathogenic bacteria.
5. Study of sterilization equipments.
6. On the job training for 1 month during summer break.

#### **Note for internal assessment (Total Marks: 25)**

50% of the total marks for the practical paper in a subject reserved for internal assessment shall be distributed as under:

1. 40% for the class assessments and tests and
2. 10% for regularity of attendance

#### **REFERENCES:**

1. Adams, M.R and Mass, M.D. (2008). Food Microbiology. newAge International Pvt. LTd. Publishers.
2. Banwart, G.T. (1987). Basic Food Microbiology. CBS Publications:New Delhi.
3. Block, J.G. (1999). Microbiology Principles and Explorations. 4<sup>th</sup> Edition. John wiley and sons Inc.
4. Frazier, W.C. (1968). Food Microbiology. 4<sup>th</sup> Edition. McGraw Hill Inc.
5. Jay, J.M., Lossner, M.J and Golden, D.A. (2008). Modern Food Microbiology. 7<sup>th</sup> edition. Springer. ISBN: 0387231803
6. Kawata, J.G. (1963). Environment Sanitation in India. Lucknow Publishing House.
7. Longree, K. (1967). Quality Food Sanitation. McGraw Hill Publishers:New York.
8. Pelezar, H.J. and Rober, D. (1968). Microbiology. 2nd Edition. McGraw Hill:New York.

**B.Sc. Food Science and Quality Control (Semester III)**

***POST HARVEST TECHNOLOGY***

**Duration of Examination: 3hrs**

**Course code: FS 301(T)**

**Credits: 4(4hrs. per week)**

**Max marks = 100**

**External assessment =80**

**Internal assessment = 20**

**Syllabus for Examination to be held in the year 2015, 2016 & 2017**

**OBJECTIVES:**

To help the students to:

- a) To study the physical and chemical changes in food.
- b) To know the basic processing technology.
- c) To assess quality control in food industry.
- d) To know the role of additives and preservatives in food industry.

**UNIT I**

1. Physical Principles underlying food processing and preservation including thermal processing, ionizing, radiations, refrigeration, freezing , dehydration.
2. Physical and Chemical changes in food that affect texture, flavor, odour, stability and nutritive value during processing and storage.
3. Basic processing technology of cereals and legumes, losses during storage, handling and processing.
4. Basic processing technology of oilseeds.

**UNIT II**

1. Basic processing technology of fruits and vegetables.
2. Basic processing technology of milk and milk products.
3. Basic processing technology of Meat, Fish, Poultry and eggs
4. Fermentation Technology, Enrichment and fortification technology. High protein technology (Single Cell Protein)

### **UNIT III**

1. Quality control in food industry-Methods of evaluation and quality control of various aspects in quality of raw material, manufacturing processes and testing of finished goods.
2. Waste disposal and sanitation
3. Extruded foods
4. Food Irradiation

### **UNIT IV**

1. Additives and Preservatives used in processing and Formulation,
2. Food Adulteration
3. Chemical and physical properties of foods.
4. Transportation, Types/Mode, optimization of transportation taking into account type of product, distance, storage, facilities etc.

### **UNIT V**

1. Market and consumer Research, Needs and types of foods – consumption trends, Psychological, Anthropological and Sociological dimensions of food consumption.
2. Food situation in India and outside. Trapping the unconventional post-harvest losses and prospects for food processing for export.
3. Traditional foods – status and need for revival in the context of non-traditional foods, urbanization and other factors.
4. Product development – Primary processing, secondary processing, types of products, e.g. quick cooking, Fast foods, fabricated foods, Convenience foods.

### ***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12x5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

**Distribution of Internal Assessment (20 Marks)**

20 marks for theory paper in a subject reserved for internal assessment shall be distributed as under:

- |      |   |                               |
|------|---|-------------------------------|
| (i)  | Class Test                                  | : 10 marks                    |
| (ii) | Two Written Assignments/<br>Project reports | : 10 marks<br>(05 marks each) |

**PRATICALS**

**B.Sc. Food Science and Quality Control (Semester III)**

***POST HARVEST TECHNOLOGY***

**Duration of Examination: 3hrs**

**Course code: FS 301(P)**

**Credits: 2(3hrs. per week)**

**Max marks = 50**

**External assessment =25**

**Internal assessment = 25**

**Syllabus for Examination to be held in the year 2015, 2016 & 2017**

1. Preservation of fruits and vegetables by following methods
  - a. Canning
  - b. Squash/Jam/Nectar
  - c. Pickles
  - d. Drying
2. To observe processing of milk at any dairy plant
3. To observe processing of cereals, meat, egg, oils at various food manufacturing Units
4. Simple physical and chemical tests to be determine quality and detect adulterants in the following:
  - i. Oil and Fats

- ii. Spices and Condiments (any five)
- iii. Food Grains, Pulses and Oilseeds
- iv. Flours – Wheat
- v. Canned foods – Drained wt.
- vi. Sugar and Honey
- vii. Milk & Milk products
- viii. Tea, Coffee

**Note for internal assessment (Total Marks: 25)**

50% of the total marks for the practical paper in a subject reserved for internal assessment shall be distributed as under:

- 1. 40% for the class assessments and tests and
- 2. 10% for regularity of attendance

**REFERENCES**

- 1. Bennion, M and Scheule, B. (2014). Introductory Foods. Pearson education.
- 2. De, S. (2008). Outlines of Dairy Technology. Oxford University Press.  
ISBN:0133055833
- 3. Manay, N.S and Shadaksharaswamy, M. (2001). Food Facts and Principles. NewAge International Publishers.
- 4. Srilakshmi, B. (2007). Food Science. NewAge International.
- 5. Subbulakshmi, G. (2001). Food Science and Preservation. NewAge International (P) Ltd.  
ISBN:8122412831



**B.Sc. Food Science and Quality Control (Semester IV)**

**SENSORY EVALUATION AND FOOD PACKAGING**

**Duration of Examination: 3hrs**

**Course code: FS 401(T)**

**Credits: 4(4hrs. per week)**

**Max marks = 100**

**External assessment =80**

**Internal assessment = 20**

**Syllabus for Examination to be held in the year 2016, 2017 & 2018**

**Objectives:**

- a) To enable students to know Sensory assessment and testing sensory evaluation.
- b) To understand Importance of packaging and Food Packaging Law.
- c) To make them understand Packaging methods and performances.

**UNIT I**

1. Sensory assessment of food quality
  - a. Appearance of food visual perception, colour
  - b. Odour and smell
  - c. Flavour
  - d. Texture
  - e. Threshold test
  - f. Difference Test
  - g. Ranking Test
  - h. Scoring Test
  - i. Hedonic Scale

**UNIT II**

1. Consideration for testing sensory evaluation
  - a. Testing area
  - b. Testing setup
  - c. Lighting setup
  - d. Testing schedule
2. Preparation of Samples
  - a. Coding and order of presentation
  - b. Types of panels-trained and consumer panels
  - c. semi-trained

### UNIT III

1. Importance of packaging
2. Evaluation of food package
3. Packaging : Criteria, appearance, protection, function, cost, material and forms of packaging

### UNIT IV

1. Different food packaging materials
  - a. Basics
  - b. laminates
2. Packaging methods and performances
3. Food packaging interactions
  - a. Global
  - b. Specific migration

### UNIT V

1. Food Packaging Law
2. Packaging evaluation
  - a. Package life theory
  - b. testing packaging materials
3. Shelf Life estimation methods

#### **NOTE FOR PAPER SETTING:**

The Question paper will consist of two sections.

**Section I:** (12\*5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

#### **Distribution of Internal Assessment (20 Marks)**

20 marks for theory paper in a subject reserved for internal assessment shall be distributed as under:

- |      |   |                               |
|------|---|-------------------------------|
| (i)  | Class Test                                  | : 10 marks                    |
| (ii) | Two Written Assignments/<br>Project reports | : 10 marks<br>(05 marks each) |

## **Books Recommended**

1. Sacharow . S, Griffin. R.C. 1970. Food Packaging. AVI Pub. Co. Technology & Engineering.
2. Food and packaging interaction; Hotchikes American Chemical Society

## **PRATICALS**

### **B.Sc. Food Science and Quality Control (Semester IV)**

#### **SENSORY EVALUATION AND FOOD PACKAGING**

**Duration of Examination: 3hrs**

**Course code: FS 401(P)**

**Credits: 2(3hrs. per week)**

**Max marks = 50**

**External assessment =25**

**Internal assessment = 25**

#### **Syllabus for Examination to be held in the year 2016, 2017 & 2018**

#### **Practicals:**

1. To carryout Threshold test for Sweet, Sour, Salty and bitter taste
2. To evaluate the food quality by sensory evaluation – Any two methods
3. To find out GSM of paper
4. To test the shelf life of a food product
5. To visit packaging industry.
6. To see quality control laboratory at any food manufacturing units.

#### **Note for internal assessment (Total Marks: 25)**

50% of the total marks for the practical paper in a subject reserved for internal assessment shall be distributed as under:

1. 40% for the class assessments and tests and
2. 10% for regularity of attendance

**B.Sc. Food Science and Quality Control (Semester V)**

**FOOD ADULTERATION & FOOD TOXICOLOGY**

**Duration of Examination: 3hrs**

**Course code: FS 501(T)**

**Credits: 4(4hrs. per week)**

**Max marks = 100**

**External assessment =80**

**Internal assessment = 20**

**Syllabus for Examination to be held in the year 2016, 2017 & 2018**

**Objectives:**

- a. To understand food laws.
- b. To assess General Composition and quality criteria for the food products.
- c. To understand Importance of toxicology.

**UNIT –I**

1. Food Laws
  - a. Voluntary
  - b. Mandatory-National & International
2. Role of voluntary agencies and legal aspects of consumer protection

**UNIT – II**

1. General Composition and quality criteria for the following:
  - a. Milk and Milk products
  - b. Oil and Fats
  - c. Spices and condiments
  - d. Food Grains
  - e. Flours
  - f. Canned Foods
  - g. Fruit and Vegetables products
  - h. Meat and poultry
  - i. Sugar and Preserves
  - j. Beverages-Alcoholic and Non Alcoholic

**UNIT– III**

1. Importance of toxicology
2. Naturally occurring toxins in various foods

3. Residual Chemical utilized in food production and processing:
  - a. Pesticides
  - b. Heavy metals, Hormones in food

#### **UNIT – IV**

1. Substances intentionally added to foods
  - a. Antioxidants
  - b. Colour
  - c. Stabilizers
2. Microbial and Parasitic
  - a. Food Poisoning and food infections or Food borne illness
  - b. Mycotoxins – aflatoxin
  - c. Bacterial toxin

#### **UNIT – V**

1. Physical treatment of food and health hazards.
2. Carcinogens
3. Genetically engineered Food and their safety.

#### ***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12\*5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

#### **Distribution of Internal Assessment (20 Marks)**

20 marks for theory paper in a subject reserved for internal assessment shall be distributed as under:

- |      |   |                               |
|------|---|-------------------------------|
| (i)  | Class Test                                  | : 10 marks                    |
| (ii) | Two Written Assignments/<br>Project reports | : 10 marks<br>(05 marks each) |

#### **References:-**

Dr. Jagmohan Negi. Edition. 2004. Food & Beverage Laws - Food Safety and Hygiene. Media : Hard Back. ISBN : 9788182040007.

A Sood . 1999. Toxicology. Published by Sarup & Sons, New Delhi ISBN 10: 8176250783 / ISBN 13: 9788176250788

R.K. Trivedy. 2001. Aquatic pollution and toxicology. 1st ed. Jaipur : ABD Publishers : Distribution, Oxford Book Co.

S.B. Vohora, V.R. Agrawal. Toxicology And Environmental Health. 2000. Asiatech Publishers Incorporated. ISBN 8187680016, 9788187680017.

## **PRACTICALS**

### **B.Sc. Food Science and Quality Control (Semester V)**

#### **FOOD ADULTERATION & FOOD TOXICOLOGY**

**Duration of Examination: 3hrs**

**Course code: FS 501(P)**

**Credits: 2(3hrs. per week)**

**Max marks = 50**

**External assessment = 25**

**Internal assessment = 25**

#### **Syllabus for Examination to be held in the year 2016, 2017 & 2018**

1. To Study distillation method
2. Preparation of Solutions
  - a. Percent Solution
  - b. Normal Solution
  - c. Molar Solution
3. To standardize 0.1N NaOH
  - a. With Na<sub>2</sub>CO<sub>3</sub>
  - b. With oxalic acid
4. To check food sample by T.S.S.
5. To study densitometer
6. Determination of Specific gravity of given sample (milk, oil)

**Note for internal assessment (Total Marks: 25)**

50% of the total marks for the practical paper in a subject reserved for internal assessment shall be distributed as under:

1. 40% for the class assessments and tests and
2. 10% for regularity of attendance

**B.Sc. Food Science and Quality Control (Semester VI)**

**FOOD ANALYSIS & FOOD MANUFACTURE**

**Duration of Examination: 3hrs**

**Course code: FS 601(T)**

**Credits: 4(4hrs. per week)**

**Max marks = 100**

**External assessment =80**

**Internal assessment = 20**

**Syllabus for Examination to be held in the year 2017, 2018 & 2019**

**Objectives:**

- d) To enable students to develop new food products which are marketable and nutritionally and economically viable.
- e) To develop entrepreneurial abilities for small scale food industries.

**UNIT – I**

1. Composition and factors affecting food composition.
2. Sampling techniques.
3. Preparation of sample.
4. General physical methods of analysis of foods.
  - a. Lactometric determination
  - b. Refractrometry
  - c. Polarimatory & Polarography
  - d. Food Rheology
  - e. Viscosity
  - f. Surface tension
  - g. Freezing point

**UNIT – II**

1. General Chemical methods of analysis in Food
  - a. Proximate principles
  - b. Moisture in spices
  - c. Specific gravity
  - d. Ash and types
  - e. Total protein ,non-protein nitrogen and specific protein in foods.



- f. Total fat and different types of lipids.
- g. Total Carbohydrates, starch, mono and disaccharides.
- h. Crude fibre and dietary fibre.
- i. Macro nutrients: Sodium, K, Mg, I, Fe
- j. Vitamins – A, D, E
- k. Trace Elements – Cu, Zn, As

### **UNIT – III**

1. Spectrophotometer – Estimation of phosphorous and ascorbic acid.
2. Radioactive tracer techniques, radioactive counters- liquid scintillation and Geiger Muller counter.
3. Fluorimeter – Estimation of Thiamin and Riboflavin.

### **UNIT – IV**

1. Principles and techniques of separation methods – chromatography (TLC, GLC, ), electrophoresis (paper, moving boundary and gel).
2. Atomic Absorption – Estimation of Iron and calcium/any trace element.
3. Measurement of enzyme activity and its principles, any one enzyme (amylase) to be estimated.

### **UNIT – V**

1. Entrepreneurship, Plant location, Investment, Financing in Project.
2. Food laws Equipment and Space.
3. Costing of product.
4. Advertising and marketing.

### **REFERENCES:**

1. Egan, Kiv,Sawyer. 1991. Pearson's chemical analysis of foods. Addison Wesley England.
2. Jacobs, Morris B.. 1939. Food—Analysis Chemistry Analytic.Publisher: New York,: D. Van Nostrand company, inc.
3. S. Ranganna.1986. Handbook of Analysis and Quality Control for Fruit and Vegetable Products. Edition, 2. Publisher, Tata Mac Graw Hill.

5. Yeshajahu Pomeranz, Clifton E . 1971. Meloan.Food Analysis: Theory and Practice. AVI Pub. Co., Technology & Engineering.
6. A Y Sathe. 1999. A First Course In Food Analysis.New Age International, 1999  
ISBN8122411940, 9788122411942.
7. New Delhi Indian Standards Institution. Published, 1980. ISI Handbook of Food Analysis  
Part I :General Methods.
8. Suzanne Nielsen. 2003. Food Analysis. Third Edition.

***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12\*5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

**Distribution of Internal Assessment (20 Marks)**

20 marks for theory paper in a subject reserved for internal assessment shall be distributed as under:

- |      |   |                               |
|------|---|-------------------------------|
| (i)  | Class Test                                  | : 10 marks                    |
| (ii) | Two Written Assignments/<br>Project reports | : 10 marks<br>(05 marks each) |

# **PRATICALS**

## **B.Sc. Food Science and Quality Control (Semester VI)**

### **FOOD ANALYSIS & FOOD MANUFACTURE**

**Duration of Examination: 3hrs**

**Course code: FS 601(P)**

**Credits: 2(3hrs. per week)**

**Max marks = 50**

**External assessment =25**

**Internal assessment = 25**

#### **Syllabus for Examination to be held in the year 2017, 2018 & 2019**

1. Project work to be submitted at the end of the course.  
Experimentation using of any one method and demonstration of the rest.
2. Proteins
  - Kjeldhal
  - Calorimetric
3. FAT
  - Physical
  - Calorimetric process of different fats
  - TLC
4. Fibre
  - Crude fibre
5. Minerals
  - Calorimetric
  - Atomic absorption spectroscopy
6. Vitamins
  - Calorimetric
  - Flourimetric

**Note for internal assessment (Total Marks: 25)**

50% of the total marks for the practical paper in a subject reserved for internal assessment shall be distributed as under:

3. 40% for the class assessments and tests and
4. 10% for regularity of attendance