SAURASHTRA UNIVERSITY

T.Y.B.Sc (Home Science) syllabus
Major Food & Nutrition
Semester V & VI

Updated June - 2018

(Chauhan Alpa, B)
Chairman
F.N. Board
<table>
<thead>
<tr>
<th>Course Rev</th>
<th>Faculty Code</th>
<th>Subject</th>
<th>Code</th>
<th>Level</th>
<th>Code</th>
<th>Semester</th>
<th>Paper No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>08</td>
<td>Food Analysis-I</td>
<td>UG</td>
<td>01</td>
<td>01</td>
<td>05</td>
<td>01</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>08</td>
<td>Food Science-I</td>
<td>UG</td>
<td>01</td>
<td>01</td>
<td>05</td>
<td>02</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>08</td>
<td>Dietetics-I</td>
<td>UG</td>
<td>01</td>
<td>01</td>
<td>05</td>
<td>03</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>08</td>
<td>Biochemistry-I</td>
<td>UG</td>
<td>01</td>
<td>01</td>
<td>05</td>
<td>04</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>08</td>
<td>Food Processing and Safety</td>
<td>UG</td>
<td>01</td>
<td>01</td>
<td>05</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>08</td>
<td>Community Nutrition</td>
<td>UG</td>
<td>01</td>
<td>01</td>
<td>05</td>
<td>06</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>08</td>
<td>Advance Physiology</td>
<td>UG</td>
<td>01</td>
<td>01</td>
<td>05</td>
<td>07</td>
<td></td>
</tr>
</tbody>
</table>
### B.Sc. (HOME SCIENCE)  SEMESTER – V (Major- Foods & Nutrition)

**Effect from Academic Year 2018-2019**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Course Opted</th>
<th>Subject</th>
<th>Theory + Practical</th>
<th>Credits</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Food Analysis-I</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Food Science-I</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Dietetics-I</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Biochemistry-I</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Food Processing and Safety</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Community Nutrition</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Advance Physiology</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>28 + 14</strong></td>
<td><strong>42</strong></td>
<td><strong>56</strong></td>
</tr>
</tbody>
</table>

### B.Sc. (HOME SCIENCE)  SEMESTER – VI (Major-Foods & Nutrition)

**Effect from Academic Year 2018-2019**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Course Opted</th>
<th>Subject</th>
<th>Theory + Practical</th>
<th>Credits</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Food Analysis-II</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Food Science-II</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Dietetics-II</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Biochemistry-II</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Food Preservation</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Food Service</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Advance Microbiology</td>
<td>04 + 02</td>
<td>6</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>28 + 14</strong></td>
<td><strong>42</strong></td>
<td><strong>56</strong></td>
</tr>
</tbody>
</table>
### SAURASHTRA UNIVERSITY, RAJKOT  
**ANNEXURE 'B'**

#### B.Sc (Home Science) Semester – V

<table>
<thead>
<tr>
<th>No.</th>
<th>Course Code</th>
<th>Course Title</th>
<th>PM</th>
<th>IM</th>
<th>EM</th>
<th>TM</th>
<th>Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Food Analysis-I</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Food Science-I</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Dietetics-I</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Biochemistry-I</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Food Processing and Safety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Community Nutrition</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Advance Physiology</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>4+2</td>
<td>6</td>
</tr>
</tbody>
</table>

**Total** 42

#### B.Sc (Home Science) Semester – VI

<table>
<thead>
<tr>
<th>No.</th>
<th>Course Code</th>
<th>Course Title</th>
<th>PM</th>
<th>IM</th>
<th>EM</th>
<th>TM</th>
<th>Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Food Analysis-II</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Food Science-II</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Dietetics-II</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Biochemistry-II</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>100</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Food Preservation</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>50</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Food Service</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>50</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Advance Microbiology</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>50</td>
<td>4+2</td>
<td>6</td>
</tr>
</tbody>
</table>

**Total** 42

**Notes:**

CC-Core Course  
DSE-Discipline Specific Elective  
SEC-Skill Enhancement Course

PM-Practical Marks  
IM = Internal Marks  
EM = External Marks  
TM = Total Marks

T-Theory  
P-Practical
<table>
<thead>
<tr>
<th>Name of Course</th>
<th>Semester</th>
<th>CC/DSE/SEC</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
<th>Internal Marks</th>
<th>External Marks</th>
<th>Practical Exam Marks</th>
<th>External Exam Time Duration</th>
<th>Practical Exam Time Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Sc Home Science</td>
<td>5</td>
<td></td>
<td></td>
<td>Food Analysis-I</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td>Food Science-I</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td>Dietetics-I</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td>Biochemistry-I</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td>Food Processing and Safety</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td>Community Nutrition</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td>Advance Physiology</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td>Name of Course</td>
<td>Semester</td>
<td>CC/DSE/SEC</td>
<td>Course Code</td>
<td>Course Title</td>
<td>Credit</td>
<td>Internal Marks</td>
<td>External Marks</td>
<td>Practical Exam Marks</td>
<td>External Exam Time Duration</td>
<td>Practical Exam Time Duration</td>
</tr>
<tr>
<td>---------------</td>
<td>----------</td>
<td>-------------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>--------</td>
<td>----------------</td>
<td>----------------</td>
<td>---------------------</td>
<td>-----------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>Food Analysis-II</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>Food Science-II</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>Dietetics-II</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>Biochemistry-II</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>Food Preservation</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>Food Service</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>Advance Microbiology</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>2 Hrs</td>
<td>5 Hrs</td>
</tr>
</tbody>
</table>
OBJECTIVES
1. To know the principles and applications of different techniques used in food and nutrition research
2. To gain knowledge about different instruments used
3. To enable the students to familiarize with different methods of investigation used in food analysis

Course content
Theory
Unit I: Sampling
1. Sampling techniques
2. Preparation of sample
3. Reporting results

Unit II: General methods of analysis of foods
1. Densitometry
2. Food rheology
3. Viscosity
4. pH meter

Unit III: Separation techniques
1. Paper chromatography
2. Thin layer chromatography
3. Gas liquid chromatography

Unit IV: To study the different parts, structure principle, working and uses of instruments used in food analysis
1. Soxhlet apparatus
2. Oven
3. Centrifuge machine
4. Kjeldahl apparatus
5. Balance
6. Water bath
7. Hot plate
Practicals

1. Sampling techniques and sample preparation for analysis
2. Separation techniques for identification of amino acids and sugars
   a. Thin layer chromatography
   b. Paper Chromatography
3. Estimation in food
   a. Moisture
   b. Protein
   c. Fat
   d. Crude fibre
   e. Ash
   f. Calcium
   g. Ascorbic acid
4. Analysis of
   a. Milk
   b. Edible oil
   c. Honey
   d. Tea

References

8. The food chemistry laboratory – A manual for experimental foods, dietetics, and food science – Connie Weaver, CRS Series.
OBJECTIVES

1) To impart knowledge pertaining to the basic properties of food.
2) To provide basic understanding of principles behind food and also with processing technology used for different foods.
3) Understand the application of science principles to experimental study of foods.
4) Develop food preparations and evaluate by sensory methods.
5) Select food to meet your requirements both in terms of food quality as well as cost.
6) Identify the different types of energy giving, body building and regulatory foods available in market.

THEORY

Unit: 1 Food acceptability

Appearance factors, kinesthetic factor and flavor factor, judged by sensory organs.

Unit: 2 Sensory evaluation of food

Definition, practical requirement for conducting sensory test, classification of sensory methods, difference tests.

Unit: 3 Unconventional foods

Soybean, ragi, unconventional leaves, mushroom, spirulina, oats, barley

Unit: 4 Energy giving foods

4.1 Cereals: Selection of cereals and millets. Nutritional factor in selection of cereals.
   4.1 a) Wheat- types, structure, composition and milling. Products of wheat (whole flour, bread flour, self raising flour, all purpose cake flour, maida, semolina), macaroni products.
   4.1 b) Rice-Composition and parboiling.
4.2 Roots and tubers: Selection of roots and tubers.

4.3 Fats and oils: Selection of fats and oils: Nutritional importance of fats and oils, Functions of fats and oils.

4.4 Sugar, jaggery and other sweetening agent:
Selection of sugar, jaggery and other sweetening agents. White crystalline sugar, cube sugar, brown sugar, liquid sugar glucose, jaggery, honey and saccharine related products, Indian chikki.

PRACTICALS

1 Sensory Evaluation by Difference Tests –
   a. Paired Comparison Test
   b. Triangle Test
   c. Duo-Trio Test

2 Preparation of Unconventional food (one preparation each).
   a. Soybean product
   b. Unconventional leaves
   c. Ragi & Oats products

3 Selecting, preparing and serving items from current restaurant menus.
   (one preparation each).
   a. Wheat
   b. Rice
   c. Roots & tubers
   d. Sugar & Jaggery
   e. Fats & oils
RECOMMENDED READINGS

2) M Swaminathan. "Food Science and Experimental Food."
3) Peckham G C. "Foundation of Food Preparation" The Mcmillan Co. 1962
4) Norman P N "Food Science" The A V I Publishing Co. 1982
5) Charley H "Food Science" John Wiley and Sons 1982
6) Griswold RM "The Experimental Study of Foods" Houghton Mighlin Co. 1962
7) Lowe B "Experimental Cookery" John Wiley and Sons.1965
8) ANC-1 Nutrition for the Community- Practical manual Part-1 IGNOU.
9) ANC-04 IGNOU.
10) CCCD-02 IGNOU.
11) Srilaxmi- Food Science.
OBJECTIVES

1) To understand the role of diet therapy.
2) Classify therapeutic diets and adaptation of normal diet.
3) Learn the different modes of feeding.
4) To gain knowledge on the dietary modifications for various diseases.
5) To acquire the ability to plan and prepare diets for various diseases.
6) Learn the assessment of patients' need, counseling, education of the patient and follow-up

THEORY

Unit: 1. INTRODUCTION

1.1 Application of the principles of diet therapy
   1.1.1 Tips for diet prescription
   1.1.2 Dietetic care in hospital patients
   1.1.3 Team approach to health care & Role of dietitian in the hospital & community
   1.1.4 Assessment of patient needs

1.2 Modes of feedings
   1.2.1 Enteral
   1.2.2 Tube Feeding
   1.2.3 Composition of tube feeds and their preparation
   1.2.4 Parenteral feeding: Indication for use

Unit 2. Risk factors for Chronic Degenerative Disorders

2.1 Diet for healthy living

Unit 3.

1.1 Dietary Management in febrile conditions, infections and HIV
1.2 Diet and surgery – Pre Operative and Post Operative nutrition

Unit 4. Etiology, Diagnosis and Dietary Management of obesity and underweight

4.1 Obesity
   4.1.1 Types and causes of obesity, prevention and treatment
4.1.2 Criteria for obesity and overweight
4.1.3 Dietary management of obesity, types of diet and desirable rate of loss of weight

4.2 Underweight
   4.2.1 The problem of underweight
   4.2.2 Definition, etiology and assessment
   4.2.3 Anorexia nervosa, bulimia
   4.2.4 Dietary Management

Unit 5. Etiology, Diagnosis and Dietary Management of Anaemia

   5.1 Nutritional Anaemia
   5.2 Sickle cell Anaemia
   5.3 Megaloblastic Anaemia
   5.4 Pernicious Anaemia
   5.5 Anaemia due to acute haemorrhages etc

Unit 6. Etiology, Diagnosis and Dietary Management of Diabetes Mellitus
   6.1 Type / Classification, symptoms and diagnosis
   6.2 Role of diet in the management of various types of diabetes mellitus and preparation of diet plans (clinical v/s medical control)
   6.3 Secondary complications of diabetes mellitus and its control
   6.4 Tests used for diagnosing and monitoring diabetes mellitus including glucose monitoring at home
   6.5 Names of tests used for diagnosing and monitoring diabetes mellitus
   6.6 Insulin therapy, oral hypoglycemic control
   6.7 Role of diet
   6.8 Diabetes in pregnancy, surgery, illness
   6.9 Diabetic coma, insulin reaction
   6.10 Use of sweet alternatives, their composition and contra indications
   6.11 Patient education and counseling

Unit 7. Dietetic Techniques and Patient Counseling
   7.1 Dieticians as part of the medical team and outreach services
   7.2 Medical history assessment-techniques of obtaining relevant information for patient profiles
   7.3 Dietary diagnosis and tests for nutritional status-Correlating clinical and dietary information
   7.4 Patient education and counseling-assessment of patient needs, establishing rapport, counseling relationship, resources and aids to counseling
7.5 Aesthetic attributes of diets
7.6 Follow up visits and patients' education.

PRACTICALS

1) Prepare list of foods rich in protein, fats, fiber, sodium, calcium, phosphorus, oxalic acid in each food exchange.
2) List of foods rich in cholesterol SFA, PUFA AND MUFA
3) Glycemic Index of food
4) Planning and preparation of:
   a. Clear liquid diet
   b. Full liquid diet
   c. Soft diet
   d. Tube feeding
5) Planning and preparation of diets for:
   a. Typhoid
   b. Patient with tuberculosis
   c. Patient with HIV infection
6) Planning and preparation of diets for:
   a. Underweight
   b. Obesity
7) Plan & prepare diet in:
   a. Nutritional Anaemia
   b. Megaloblastic Anaemia
8) Planning, Preparation and calculation by use of exchange list for:
   a. Diabetes Mellitus
      i. Normal Weight
      ii. Pregnancy

RECOMMENDED READINGS

4. Krause M.V. and Hinster M.- Food, Nutrition and Diet Therapy, W.B. Saunders
5. Vaid B. M. - Diet Therapy, Saurashtra University
6. Vaid B. M. - Therapeutic Nutrition, Saurashtra University
7. Vaid B. M – Dietetics, Saurashtra University
FOCUS
The course lays the foundation for understanding the functioning of metabolic processes at cellular level and the role of various nutrients in these processes.

OBJECTIVES
This course will enable students to -

1. Develop an understanding of the principles of biochemistry (as applicable to human nutrition)
2. Obtain an insight into the chemistry of major nutrients and physiologically important compounds.
3. Understand the biological processes and systems as applicable to human nutrition.
4. Apply the knowledge acquired to human nutrition and dietetics.

Unit 1 Carbohydrates
- Definition
- Physical and chemical properties of carbohydrates
- D & L form
- Stereoisomerism - Optical activity
- Ring structures
- Reactions of monosaccharide
  A. Ofsazone formation
  B. Oxidation reaction
  C. Reduction reaction
- Amino sugars
- Mucopolysaccharides and glycoproteins

Unit 2 Proteins and Amino Acids
- Classification of proteins on basis of reactive groups & chemical nature
- Structure of protein
- Classification and structure of amino acids
- Physical and chemical properties of amino acids
  A. Salt formation
  B. Ester formation
C. Color reaction of amino acids and proteins

Unit 3 Lipids

Fatty Acids
- Classification of fatty acids
- Physical and chemical properties of amino acids
- Hydrogenation
- Halogenation
- Oxidation
- Biological oxidation

Fats
- Physical and chemical properties of fats
- Hydrolysis
- Saponification
- Rancidity
- Acid number
- Iodine number

Some Important Steroids
- Cholesterol
- Ergosterol
- Sphingosine
- Bile salts

PRACTICALS
1. Cole's method – Glucose, Lactose
2. Acid value
3. Iodine value
4. Glucose estimation by DNSA method
5. Protein estimation by Folin-Wu method
6. Preparation of casein from milk
7. Preparation of standard solution
REFERENCE BOOKS

OBJECTIVES

1) To make the students understand the importance of food additives and fortification.
2) To gain knowledge of food packaging and convenience food
3) To orient student to food safety laws and standards

THEORY

Unit – 1 Food Additives
1.1 Meaning
1.2 Classification of additives

Unit – 2 Food Fortification
2.1 Purpose and meaning of food fortification
2.2 Different fortified foods available in market

Unit – 3 Food Packaging
3.1.1 Types and importance of food packaging
3.1.2 Material used for packaging
3.1.3 Qualities of packaging materials

Unit – 4 Convenience Foods
4.1 Types of convenience foods
4.2 Advantages and disadvantages
4.3 Extruded food

Unit – 5 Vinegar preparation
5.1 Types of vinegar
5.2 Yeast used for vinegar preparation
5.3 Method of preparation
Unit–6 Food safety law and food standards

Practical:

1. Market survey of fortified foods.
2. Market survey of convenience food with food additives used in it.
3. To prepare any one convenience food in the laboratory.
   To package, prize and label convenience food prepared in the laboratory.
4. Visit of a food laboratory or food standard institute or food packaging industry or lecture of a food inspector.

RECOMMENDED READING

3. M. Swaminathan, “Food Science, Chemistry and Experimental Foods”.
OBJECTIVES

1) To orient students to the basic principles of community nutrition
2) To acquire knowledge regarding the recent theories and components of communication as relevant to nutrition health
3) To learn about Nutrition-Health-Communication (NHC) programmes and experiences in the developing world of India
4) To gain skills in planning and conducting NHC projects

THEORY

Unit – I Demography and Vital statistics

1.1 Demographic profile
1.2 Vital statistics of developed and developing countries
1.3 National Population Policy (NPP)

Unit II Introduction to assessment of nutritional status

2.1 Direct Parameters

2.1 a) Anthropometry
Classifications – WHO Standards , IAP etc
WHO Nutrition Targets to be achieved by 2025
ii. Various standards for reference for different age groups
iii. Use of growth charts

2.2 b) Diet Surveys
i. Family food questionnaire and record procedure
ii. Weighed food inventory
iii. Recipe method
iv. Weigh as you eat
v. Food composite analysis method
vi. Food diaries and others
• Adult consumption unit

2.3 Clinical assessment

2.4 Biochemical estimations, their estimations and critique

2.5 Indirect Parameters
I. Socio-economic status
II. Morbidity Rates, Burden of NCD in India,
III. Mortality Rates (IMR, NMR, MMR, CDR, CBR) U5- MR

Unit – III

3.1 Nutrition and Health Programmes in India
a) National Nutrition Policy (NNP)
b) Janani Suraksha Yojana
c) National Fluorosis Control Programme
d) Antyodaya Anna Yojana (AY)
e) Annupurna Scheme

3.2 National organisations working for community Nutrition and Health –
ICAR, NIN, CFTRI

3.3 International Organizations working for Community Nutrition and Health—
FAO, WHO, UNICEF, CARE.

Unit – IV

Severe Acute Malnutrition (SAM): A silent Nutrition Emergency and
Community based Management of SAM
- Severe Acute Malnutrition, its definition, diagnosis
- Standard WHO protocol for Facility based and Community based SAM as given in
  F-IMNCl training protocol.
- Composition of F-75 and F-100 and indigenous locally used replacement of WHO formulas
- Use of ready-to-use therapeutic food in management of SAM in Community (RUTF)
- Experiences of SAM management through Nutrition Rehabilitation centers (NRC’S)
- Gujarat Model: Creation of CDNC centers for SAM Management: Strengths and weaknesses.

PRACTICALS
1. Diet Survey
   a. Assessing the frequency of consumption of various foods in the community.
   b. Survey of food habits of various communities viz between rural and urban of ethnic groups of different socio-economic groups

2. Anthropometric measurements for children in poor and affluent or urban and rural groups comparisons with the standards and interpretations
   a. Weight b. Height c. BMI d. waist/hip ratio e. MUAC

3. Understanding clinical signs and symptoms of various nutritional disorders
   a. Visit to the corporation schools
   b. Visit to the pediatric ward in the civil hospital
   c. Visit to NRC & CDNC

4. Visit to the various community based programmes focused on health and nutrition and conduct interviews report writing with
   a. Organizations and service providers
   b. Beneficiaries regarding participation and its impact
   c. Visit to NRC & CDNC for SAM children

RECOMMENDED READINGS
• Food and Nutrition Board (1995) National Plan of Action on Nutrition, Department of Women and Child Development, Ministry of HRD, Govt of India
• IGNOU - DNE - 2 Block – 6
• IGNOU DNE - 3 Block – 6
• IGNOU DNE - 3 Block – 2
• IGNOU DNE - 2 Block – 6
• IGNOU Public Nutrition-MFN006
• Preventive and Social medicine by Park & Park 21st Edition
  • WHO-Child Growth Standards for SAM children-2009
  • WHO Guidelines for Inpatient treatment for SAM child-2003
  • Community based Management of SAM-UNICEF-2009
  • National guidelines and consensus on Management of SAM-2009
  • Indian Pediatrics, val-47, 2010-Management of Acute Malnutrition
OBJECTIVES
The course will enable students to

1. Advance their understanding of scope of the relevant issues and topics of human physiology.
2. Enable the students to understand the integrated function of all systems and the grounding of nutritional science in physiology.
3. Understand alterations of structure and function in various organs and systems in disease conditions.

THEORY
Unit: 1 Homeostasis
- Concept of Homeostasis
- Role of Body system in maintaining Homeostasis

Unit: 2 Body temperature, Temperature Regulation
- Normal Body Temperature
- Heat Production & Heat loss
- Regulation of Body Temperature

Unit: 3 Blood
- Composition of blood
  - Plasma, plasma proteins and its functions
  - Blood cells – Types and functions
  - Coagulation of blood
  - Blood group & Rh factor
  - Structure of heart, junctional tissue & its regulation,
  - Blood pressure & factors blood maintain blood pressure

UNIT: 4 Reproductive System
- Types and Structure of Chromosome, Karyotype
- Spermatogenesis and oogenesis
- Pregnancy- development of fertilized ovum up to placental stages
  - Different stages of development of fetus.
- Parturition – different stages of labour
- Structure of breast- lactation & secretion of milk.
UNIT: 5 Nervous System
- Types of neurons
- Transmission of nerve impulse in nerve fibers & synapse

PRACTICAL
1. Preparation of smear and identification of blood cell.
2. Demonstration of Barr Body
3. Blood group and Rh factor
5. Total count of WBC and RBC
6. Differential count of WBC
7. Measurement of blood pressure (After Exercise & during rest)
8. Abnormalities of urine: sugar, protein, bile salt, ketone bodies & blood
9. Measurement of body temperature and pulse rate (After Exercise & During rest)
10. Study of permanent slides different organs of System - Digestive, Respiratory, Circulatory, Reproductive, Endocrine and Nervous.

REFERENCE BOOKS
1. Human physiology – C.C. Chatterjee
2. Human Physiology – Agrawal
3. Text book of Medical Physiology – Guyton
4. Essentials of Medical Physiology - By K. Sembulingam; Prema Sembulingam
   Jaypee Brother Medical Publishers Ltd
5. Essentials of Medical Physiology - Guyton sanders, Oxford University, London
6. Human Physiology - By C.B. Fox
OBJECTIVES

1. To know the principles and applications of different techniques used in food and nutrition research
2. To gain knowledge about different instruments used
3. To enable the students to familiarize with different methods of investigation used in food analysis

Course content

Theory

Unit I: Separation technique
   1. Electrophoresis

Unit II: Tracer techniques
   1. Use of radioactive isotopes in biology and medicine and food

Unit III: General methods of analysis of foods:
   1. Refractometry
   2. Polarimetry

Unit IV: Principles, operation and use of the techniques
   1. Colorimetry
   2. Flame photometry
   3. Fluorimetry

Unit V: Analytical Microbiology

Unit VI: Thermal analysis of foods

Practicals

1. Estimation in food
   a. Iron
2. Analysis of
   a. Butter
   b. Ghee
   c. Coffee
d. Spices

References


8. The food chemistry laboratory – A manual for experimental foods, dietetics, and food science – Connie Weaver, CRS Series.


OBJECTIVES

1) To impact knowledge pertaining to the basic properties of food.
2) To provide basic understanding of principles behind cooking foods and also with processing technology used for different foods.
3) Understand the application of scientific principles to experimental study of foods.
4) Develop food preparation and evaluate by sensory methods.
5) Select food to meet your requirements both in terms of food quality as well as cost.
6) Identify the different types of energy giving, body building and regulatory foods available in market.

THEORY

Unit -1 Colloidal System in Foods
1.1 Definition - Difference between colloid, suspension and solution.
1.2 Types of colloidal dispersion, properties of colloidal dispersion.
1.3 Dispersion of substances in food preparation.

Unit - 2 Evaluation of food by Objective methods
2.1 Definition, Advantages and Disadvantages
2.2 Classification of Objective methods

Unit -3 Sensory Evaluation (Rating tests)
3.1 Ranking test
3.2 Two sample difference test
3.3 Multiple sample difference test
3.4 Hedonic test
3.5 Numerical scoring test
3.6 Composite scoring test

Unit - 4 Body building food

4.1 Pulses:
Selection of pulses, commonly used pulses, nutritional factors in selection of pulses, toxic factors in pulses.

4.2 Milk and Products
Selection of milk and milk products, chemical composition, standardizing, pasteurization, kinds of milk available, food products derived from milk such as cream, ghee, curd, paneer, khoa, milk powder, cheese.

4.3 Selection of Flesh Foods
Selection of flesh foods, meat, poultry, eggs, fish and other sea foods

4.4 Nuts
Selection of nuts.

Unit - 5 Protective/Regulatory foods

5.1 Vegetables
Selection of vegetables, chemical composition of vegetables and effect of heat on them, salad.

5.2 Fruits
Selection of fruits, composition, ripening and storage of fruits, banana, orange, mango, lime, custard apple, pineapple, papaya, chiku, guava, amla, melons, grapes, peach, berries.

PRACTICALS

1 Sensory Evaluation by Rating Tests -
   a) Sensory evaluation of different products by Ranking test
   b) Sensory evaluation of different products by Two sample difference test
   c) Sensory evaluation of different products by Multiple sample difference test
   d) Sensory evaluation of different products by Hedonic test
e) Sensory evaluation of different products by Numerical scoring test
f) Sensory evaluation of different products by Composite scoring test

2 Selecting, preparing and serving items from current restaurant menus.
   (one preparation each).
   a) Legums
   b) Milk & milk products
   c) Vegetables
   d) Fruits
   e) Snacks

RECOMMENDED READINGS

2) M Swaminathan "Food Science and Experimental Food."
3) Peckham G C. "Foundation of Food Preparation" The Mcmillan Co. 1962
4) Norman P N "Food Science" The A V I Publishing Co. 1982
5) Charley H "Food Science" John Wiley and Sons 1982
6) Griswold RM "The Experimental Study of Foods" Houghtan Migglin Co. 1962
7) Lowe B "Experimental Cookery" John Wiley and Sons.1965
8) ANC-1 Nutrition for the Community- Practical manual Part-I IGNOU.
9) ANC-04 IGNOU.
10) CCCD-02 IGNOU.
11) Srilaxmi- Food Science.
OBJECTIVES

1) To understand the applications of principles of diet therapy
2) Plan and prepare diets for different diseases
3) To understand and use functional foods in diet therapy

Unit 1. Etiology, Diagnosis and Dietary Management of common Gastro intestinal disturbances

1.1 Constipation
1.2 Diarrhoea
1.3 Peptic Ulcer
1.4 Ulcerative Colitis

Unit 2 Etiology, Diagnosis and dietary management of Liver Disorders

2.1 Liver functions - normal and deranged
2.2 Role of diet in liver health
2.3 Liver function tests and nutritional care in liver diseases
2.4 Viral hepatitis
2.5 Cirrhosis
2.6 Alcoholic liver diseases
2.7 Cholecyctitis, Cholelithiasis, Pancreatitis

Unit 3. Etiology, Diagnosis and Dietary Management of

3.1 Hypertension
   3.1.1 Types, role of diet in the management of various types of hypertension
   3.1.2 Consequences and complications of hypertension
   3.1.3 Lifestyle changes and behavior modification in hypertension
   3.1.4 Use of salt alternatives, their composition and contraindications

3.2 Atherosclerosis / Ischemic heart disease
   3.2.1 Types and risk factors
   3.2.2 Role of diet
3.2.3 Diet after bypass surgery and heart attack
3.2.4 Prevention: control of risk factors and lifestyle changes

Unit 4. Etiology, diagnosis and dietary management of renal disorders
4.1 Renal functions: normal and deranged, Diagnosis: names of renal function tests
4.2 Glomerulonephritis
4.3 Nephrotic Syndrome
4.4 Acute and chronic renal failure
4.5 Dialysis, Renal transplant
4.6 Renal calculi

Unit 5. Etiology, diagnosis and Dietary Management
5.1 Cancer, types and etiological factors
5.1.1 Role of diet in prevention of all types of cancers
5.1.2 Nutritional management of cancer patients undergoing
   5.1.2.1 Radiotherapy
   5.1.2.2 Chemotherapy
   5.2.2.3 Diet to be followed after treatment
   5.2.3.4 Cachexia
5.2 Side effects of cancer therapy and suggested diet modifications

Unit 6 Some special conditions requiring nutritional support
6.1 Bone disorders
6.2 Allergy
6.3 Burns: Nutritional management
6.4 Metabolic disorder: Diseases of the adrenal cortex, thyroid and parathyroid glands, gout, spontaneous hypoglycemia, phenylketonuria

Unit 7. Therapeutics food products: Definition, types, need
1. Planning, preparation and calculation by use of exchange list for:
   a) Gastrointestinal disturbances
      i. Constipation
      ii. Diarrhoea
      iii. Peptic Ulcer
      iv. Ulcerative Colitis
   b) Liver Disorder
      ii. Hepatitis
      iii. Cirrhosis of liver with ascites
   c) Cardiovascular disease
      i. Hypertension
      ii. Atherosclerosis
      iii. Diet for a patient after heart attack
      iv. Diet for a patient after bypass surgery
   d) Renal disorders
      i. Diet for acute nephritis
      ii. Diet for chronic renal failure
      iii. Diet for a patient on dialysis
      iv. Diet for renal calculi
   e) Cancer:
      i. Oral diet for cancer patients
      ii. Tube feeding for cancer patients
   f) Diet in metabolic disorders
      i. Gout
      ii. Hypothyroidism
      iii. Hypoglycemia
      iv. Phenylketonuria
   g) Plan and prepare recipes from Therapeutic food products.
h) Case study:
   i. Select any one patient and record the diagnosis, laboratory findings and detailed
dietary and clinical history
   ii. Write down the steps in counseling and formulate a new diet for the diagnosed disease
   iii. Prepare a report and do a formal presentation

RECOMMENDED READINGS

1. Anderson, Dibble, Tukki, Mitchell, Rynbergen – NUTRITION IN HEALTH AND
DISEASE, 17th Ed, J.B. Lippincott Co. USA.

2. B. Srilakshmi – DIETETICS, 3rd Ed, New Age International (P) Ltd. Publisher, New Delhi

3. Carol West Suito, Merrilyl Forbes, Crowley – Nutrition – Principles and application
in Health Promotion, 2nd Ed, J.E. Lippincott Co. Philadelphia

4. Clifford R Anderson – MODERN WAYS TO HEALTH, Southern Publishing
Association, Nashville Tennessee.

5. Corinne H Robinson, Marilyn R Lawler – Normal and Therapeutic Nutrition, 17th
Edi Oxford and IBH Publishing Co., New Delhi

6. Dr. R. Kumar, Dr. Meenal Kumar – Guide To Healthy Living, Deep and Deep

7. FOODS THAT HARM FOODS THAT HEAL, Reader’s Digest Association Ltd.,
2001

University Press, New Delhi

Saunders Co., Philadelphia

10. M. Swaminathan – ESSENTIALS OF FOODS AND NUTRITION, Bappco,
Bangalore

11. Peggy S. Standfield and Y.H. Hui NUTRITION AND DIET THERAPY – SELF
INSTRUCTIONAL MODULES, 4th Edi W.B. Saunders Co., Philadelphia

Publishing Co., Ltd New Delhi

13. S.R. Williams – ESSENTIALS OF NUTRITION AND DIET THERAPY, 5th Edi,
Times Mirror / Mosby College Publishing, Boston.

14. SOME THERAPEUTIC DIETS, NIN, Hyderabad

15. Vaid B. M. – Diet Therapy, Saurashtra University
16. Vaid B. M. - Therapeutic Nutrition, Saurashtra University
OBJECTIVES
This course will enable the students to:

1. Understand the mechanism adopted by the human body for regulation of metabolic pathways.
2. Get an insight into interrelationship between various metabolic pathways.
3. Understand integration of cellular level metabolic events to nutritional disorders and imbalances.

Unit 1 Digestion and Absorption in Gastrointestinal Tract
1. Digestion of various Food
   a. Digestion of carbohydrates
   b. Digestion of Protein
   c. Digestion of lipids
2. Absorption in small intestine
3. Absorption in the large intestine
4. Factors affecting secretion of digestive juice

Unit 2 Introduction To Metabolism.
- Integration of metabolism
- Errors in metabolism

Unit 3 Carbohydrate Metabolism.
- Carbohydrate metabolism
- Reactions & energetic of
  A. Glycolysis—Aerobic and anaerobic
  B. Krebs Cycle
  C. Electron Transport Chain
  D. Oxidative Phosphorylation

Unit 4 Protein Metabolism
- Transamination
- Deamination (Oxidative)
- Decarboxylation
- Urea cycle
- Protein synthesis.

Unit 5 Lipid Metabolism
- B - Oxidation of saturated fatty acid and it's energetic.
- Metabolism of ketone bodies and ketosis

Unit 6 Enzymes
- Importance and specificity.
- Chemical nature
- Classification and nomenclature
- Enzyme kinetics (factors affecting enzyme action)
- Coenzymes and isoenzymes.
- Inhibitors
- Clinical importance of enzymes.

Practicals
1. Effect of pH on amylase activity
2. Effect of Temperature on amylase activity.
3. Preparation of potato starch and estimation by Cole's or DNSA method
4. Estimation of calcium
5. Estimation of chloride

Recommended Readings
1. Biochemistry by Lehninger
2. Biochemistry by Harper
3. Biochemistry by West and Todd
4. Biochemistry by Conn and Stumph
5. Biochemistry by Stryer
OBJECTIVES

1) To understand the principles of food preservation
2) To prepare students for home scale production for preservation of products such as Jam, Jelly, tomato ketchup etc.
3) To Orient students regarding different methods of food preservation
4) To appraise the students of the latest development in food preservation

THEORY

Unit-1 Introduction of Food Preservation
1.1 Importance of food preservation
1.2 Principle of food preservation
1.3 Bacteriostatic method
1.4 Bactericidal method

Unit-2 Food spoilage
2.1 Food fit for consumption.
2.2 Deterioration of food quality – non perishable, semi perishable and perishable foods.
2.3 Causes of food spoilage.

Unit-3 Methods of food preservation
3.1 Canning
3.1.1 Principles, steps in canning
3.1.2 Spoilage in canned foods
3.2 Freezing and refrigeration
3.2.1 Principles involved, types of storage at low temperature
3.2.2 Selection criteria for freezing material
3.3 Drying and dehydration
3.3.1 Principles – sun drying
3.3.2 Types of driers- (home made dryer, spay dryer, vacuum dryer, tunnel dryer)
3.3.3 Packaging and storage of dehydrated food
3.4 Food irradiation
3.4.1 Ionizing radiation and its sources
3.4.2. Effects of radiation on nutritive value of food
3.4.3. Use of radiation for different food groups.

Unit – 4 Preservation of food products
4.1 Fruit juice and squashes
4.2 Jam, Jelly, Marmalade.
4.3 Tomato products (Chutney and ketchup)
4.4 Pickles

PRACTICALS

Prepare the following food products in the laboratory.
1. Syrup and Squash
2. Jam
3. Jelly
4. Marmalade
5. Pickles
6. Chutney
7. Tomato ketchup
8. Freezing

RECOMMENDED READING

3. M. Swaminathan, “Food Science, Chemistry and Experimental Foods”.
Objectives:

1) To understand different styles of food services.
2) To understand setting the table.
3) To understand and practice serving and clearing techniques.

Unit 1: Setting the table:
- Placing linen, placing decoration, laying flatware, placing glassware, placing dinnerware, laying the beverage service,
- placing the accessories, placing serving dishes of food, setting the serving table.

Unit 2: Styles of meal service:
- Western services - Restaurant services - French service, English service, Russian service, American service, Cafeteria service, Buffet service, Silver service, Gueridon service, Tray service, Family service, Continental Service.

Unit 3: Serving meals with & without waiting on the table:
- Waiting on the table - Removing the main course, when the dessert is served.
- Serving without waiting - Setting the side table, using the side table.

Unit 4: Serving Tray meals:
- Setting the tray for tray meals, service when meals are eaten from trays.

Practical:
1) Serving and clearing practice:
a) Food / Meal service - Soup service, vegetable service, crumbing down
b) Service of beverages
2) Tray service
3) Buffet service
4) Preparing Continental, Italian, Thai, Chinese, Mexican cooking, Fast foods: (one preparation each.)

References:

1) Peckham GC “Foundation of Food Preparation” The Mc Millan Co. 1969.
4) Entrepreneurship and Food Service Management – MFN 007, IGNOU.
T.Y.B.Sc. (Home-Science) (MAJOR: FOODS & NUTRITION) SEMESTER VI

ADVANCE MICROBIOLOGY PAPER 7

(CREDITS: THEORY-4, PRACTICAL-2, TOTAL-6)

OBJECTIVE

This course will enable the students to:

1. Gain deeper knowledge of role of micro-organisms in humans and environment.
2. Understand the importance of micro-organisms in food spoilage and to learn advanced techniques used in food preservation.
3. Understand the latest procedures adopted in various food operations to prevent food-borne disorders and legal aspects involved in these areas.

THEORY

UNIT 1 INTRODUCTION

Microbiology – Basic concepts and application
Importance of Microbiology- Economic, Industrial and Medical

UNIT 2 FOOD SAFETY AND TOXICOLOGY

- Microbiological Examination of Food
- Naturally occurring toxicants and food contaminants
- Microbial problems in food safety including Mycotoxins and Viruses
- Environmental, pesticide residue and food additives
- Safety aspects of foods produced by biotechnology and genetic engineering

UNIT 3 METHODS OF ISOLATION AND DETECTION

- Isolation and detection of micro-organisms in food
- Conventional methods
- Rapid methods
- Immunological methods – Fluorescent, antibody, radioimmunoassay, ELISA
- Chemical method

UNIT 4 MILK MICROBIOLOGY
• Pasteurization of milk
• Microbes used in dairy industry
• Cheese and ripening of cheese

UNIT 5 BAKERY
• Microbes used in bakery
• Useful and harmful microbes

UNIT 6 FERMENTED FOOD
• Fermented food
• Oriented fermented food
• Foods produced by micro-organisms
• Single cell proteins

UNIT 7 PROBIOTICS AND NUTRACUTICALS

PRACTICALS
1. Identification of organisms on basis of biochemical and morphological key
2. Staining - Negative and Spore
3. Observation of micro-organisms from bread, fruits, vegetables, cooked food - rice and chapatis and pickles
4. Food processing industries visit

REFERENCE BOOKS

[Signature]
Chairman F & N. Board