# SNDT Women's University

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## Syllabus for
## Degree of Bachelor of Science
## Food Science and Nutrition
## (Faculty of Home Science)


With effect from
Academic Year 2013-14

**Shreemati Nathibai Damodar Thackersey Women's University**
**1, Nathibai Thackersey Road, Mumbai – 400 020.**

Degree of Bachelor of Science
Food Science and Nutrition
(Faculty of Home Science)

## Specialization: Food Science and Nutrition

### Sub Specialization: Food Science and Nutrition

### SEMESTER III

| Code No. | Course | TC | ThC | PrC | IntM | ExtM | Total | Exam U/C |
|---|---|---|---|---|---|---|---|---|
| 9301 | Nutrition for Life Span (a) | 4 | - | 4 | 100 | - | 100 | C |
| 9302 | Consumer Studies (b) | 4 | 4 | - | 25 | 75 | 100 | U |
| 9303 | Family Dynamics (a) | 4 | 3 | 1 | 25 | 75 | 100 | U |
| 9304 | Media Skill Development (b) | 4 | 3 | 1 | 25 | 75 | 100 | U |
| 9305 | Fabric Ornamentation and Accessory Design (b) | 4 | - | 4 | 100 | - | 100 | C |
| | **TOTAL** | **20** | **10** | **10** | **275** | **225** | **500** | |

### SEMESTER IV

| Code No. | Course | TC | ThC | PrC | IntM | ExtM | Total | Exam U/C |
|---|---|---|---|---|---|---|---|---|
| 0741 | Advanced Chemistry (b) | 4 | 2 | 2 | 25 | 75 | 100 | U |
| 0742 | Food Microbiology (b) | 4 | 2 | 2 | 25 | 75 | 100 | U |
| 0743 | Human Nutrition -I (a) | 4 | 4 | - | 25 | 75 | 100 | U |
| 0744 | Food Analysis (a) | 4 | - | 4 | 25 | 75 | 100 | U |
| 0745 | Food Preservation (b) | 4 | 3 | 1 | 25 | 75 | 100 | C |
| | **TOTAL** | **20** | **11** | **9** | **125** | **375** | **500** | |

## Semester III
## Nutrition for Life span

**Objectives**:
The course will enable students to -

- Understand the physiological changes, special needs and health concerns of people at different stages of life
- Understand the importance of nutrition to physical, psychological growth and development and ageing.

| | Course | TC | Th C | Pr C | Int M | Ext M | Total |
|---|---|---|---|---|---|---|---|
| | **Nutrition for Life span** | 4 | - | 4 | 100 | - | 100 |

| Module No. | Objectives | Content | Assessment |
|---|---|---|---|
| **1** | This will enable students to:<br>1. Know the nutritional requirements and understand the concept of RDA<br>2. Comprehend the concept of food guide and translate the same into planning | **Basics of Meal Planning**<br>1. Overview of nutritional requirements<br>2. Food Guide/ Food Pyramid and its use<br>3. Food Exchange List<br>4. Balanced diet<br>5. Factors affecting meal planning<br>6. Maintaining a dietary record | Quiz/ Assignments / Projects<br>Viva |
| **2** | This will enable students to:<br>1. Plan balanced diets for individuals keeping in mind their physical activity, income group, social and cultural background<br>2. Suggest dietary modifications for common ailments | **Nutrition in Adulthood**<br>1. Planning meals for sedentary, moderate and heavy workers<br>2. Dietary modifications for common ailments: diarrhea, constipation, Underweight, obesity and fever | Quiz<br>Planning and Cooking Practical<br>Viva |
| **3** | This will enable students to:<br>1. Learn the physiological changes during pregnancy and lactation<br>2. Understand the effect | **Nutrition during Pregnancy and Lactation**<br>Planning meals for various physiological conditions<br>- Pregnancy<br>- Lactation | Quiz<br>Planning and Cooking Practical<br>Viva |

| | | | |
|---|---|---|---|
| | of physiological changes on nutritional requirements<br>Understand the role of nutrition in pregnancy outcome and during lactation | | |
| **4** | This will enable students to:<br>Understand the physiological changes during growth, development and ageing and their effect on nutritional needs | **Nutrition during Life cycle**<br>1. Planning meals for different age groups<br>- Infancy<br>- Childhood<br>- Adolescence<br>- Old age | Quiz<br>Planning and Cooking Practical<br>Viva |

**Evaluation:**

- **Planning = 50 marks** (including projects and assignments)
  (Each plan to be evaluated out of 10 marks and average to be taken)
- **Cooking practical = 30 marks**
  (Each cooking practical to be evaluated out of 10 marks and average to be taken)
- **Quiz = 20 marks (**including viva**)**
- **Total = 100 marks.**

**REFERENCES:**


1. Mudambi, S.R., Rajgopal, M.V.(2012), Fundamentals of Foods and Nutrition, New Age International Pvt. Ltd.
2. Food Science (2012), Maharashtra State Board of Secondary and Higher Secondary education Pune, 1st Edition, Sheth Publications.
3. Roday Sunetra, (2012), Food Science and Nutrition, 2nd Edition, Oxford University Press.
4. Joshi, Shubhangini (2009), Nutrition and Dietetics , Mcgraw Hill Higher Education.
5. I.C.M.R. Publications 2010, Nutrient requirement and recommended Dietary Allowances for Indians.
6. C. Gopalan, B.V. Rama Sastri and S.C. Balasubramanium, Nutritive Value of Indian Foods, NIN, ICMR, Hyderabad.
7. Robinson, and Lawler, (1990), Normal and Therapeutic Nutrition 17th Edition MacMillan Pub. Co.
8. Guthrie Helen (1986). Introductory Nutrition, Times Mirror/ Mosby College Publishing.
9. Wardlaw G.M, (1997), Contemporary Nutrition, Issues and Insights, 3rd Edition Tata Mc GrawHill Inc. Boston.

10. Guthrie, Helen (1994), Human Nutrition, William C Brown Pub.

## Semester III
## Consumer Studies

**OBJECTIVES:**

1. The overall goal of consumer studies is to create awareness about consumer problems in the market.
2. To impart knowledge regarding the role of consumer guides and agencies.
3. To enable the students to develop good buymanship skills in the selection of goods and services in the market.
4. To help the students to realize their rights and responsibilities as informed consumers

| Course | TC | Th C | Pr C | Int M | Ext M | Total |
|---|---|---|---|---|---|---|
| **Consumer Studies** | 4 | 4 | - | 25 | 75 | 100 |

| Module No. | Objectives | Content | Evaluation |
|---|---|---|---|
| 1 | The learner understands the term consumer and can define it.<br><br>To provide information regarding the need for consumer education.<br><br>To create awareness regarding consumer problems. | **CONSUMER AND CONSUMER PROBLEMS**<br>**1.1 DEFINITION AND NEED OF CONSUMER EDUCATION**<br>• Introduction to Consumer Problems related to goods and services<br>• Meaning and Objectives of Consumer Education<br>**1.1. CONSUMER MOVEMENT**<br>• Background/History of Consumer Movement<br>• Emergence of Consumer Movement in India<br>• Causes for slow growth of Consumer Movement in India<br>**1.2. CONSUMER PROBLEMS**<br>• Adulteration | Identify 5 consumer problems related to food adulteration/ faulty weights and measures/ sales gimmicks. Interview a consumer who has faced some problem related to any one of the areas mentioned above, in the market and document the |

| | | | |
|---|---|---|---|
| | | • Faulty Weights and Measures<br>• Misleading Advertisements<br>• Other Malpractices such as lack of safety and quality control regulations, sales gimmicks, unfair warranties, massive profiteering and illegal trading. | same.<br>10 Marks<br><br>Presentation of the report<br>15 Marks |

| Module No. | Objectives | Content | Evaluation |
|---|---|---|---|
| 2 | To provide knowledge regarding various consumer guides<br>To create an understand-ing of different brands, labels and grading and standard-ization. | **CONSUMER GUIDES**<br>**2.1 BRANDS**<br>• Meaning<br>• Types of brands such as Individual, Family, Umbrella, Combination device and Private or Middleman's brand.<br>**2.2. LABELS**<br>• Meaning and types of labels<br>• Essentials of labels<br>**2.3 GRADING AND STANDARDIZATION**<br>• Meaning and types (Qualitative and Quantitative)<br>• Standardization process - grading, sampling, sorting and packaging<br>**2.4 ADVERTISEMENTS**<br>• Influence of advertisements on consumers<br>• Usefulness of advertisements to consumers<br>• Misleading advertisements<br>**2.5 ROLE OF CONSUMER AGENCIES**<br>• Role of BIS, AGMARK, FPO and ECO MARKS | Collect 5 samples for labels from various products such as food/ medicines/cosmetics/clothing. 10Marks<br>Write a detailed report regarding the infor-mation given to the Consumers through these labels followed by a discussion in the class regarding the positive and negative points of the labels. 5 Marks<br>Observe and critically analyze 5 advertisements from any media like Television/ radio / print media and write a detailed report followed by a discussion in the class. 10 Marks |

| Module No. | Objectives | Content | Evaluation |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 3 | To help students make better decisions in the market as a wise consumer. | **CONSUMER DECISION MAKING**<br>**3.1 CONSUMER DECISIONS**<br>Decision making process<br>• Problem recognition<br>• Information seeking<br>• Equation of alternatives<br>• Buying decisions<br>• Post purchase evaluation<br>3.2 **GOOD BUYMANSHIP** | Observe how decision making process is used, in your own family for the purchase of some consumer product like refrigerator/television / food processor/ washing machine and write a report<br>25 Marks |

| Module No. | Objectives | Content | Evaluation |
|---|---|---|---|
| 4 | To make the learners aware about their protection from the malpractices in the market.<br><br>To create an understanding about different rights and responsibilities among the students.<br>To inform the students regarding various Acts and Agencies | **CONSUMER PROTECTION**<br>**4.1 NEED FOR CONSUMER PROTECTION**<br>**4.2 CONSUMER RIGHTS**<br>• Right to be heard<br>• Right to choose<br>• Right to be informed<br>• Right to seek redressal<br>• Right for Protection<br>• Right to Basic needs<br>• Right to Consumer Education<br>• Right to secure ecological balance<br>**4.3 CONSUMER RESPONSIBILITIES**<br>**4.4 CONSUMER ACTS AND AGENCIES**<br>• Acts: COPRA,<br>Agencies: CGSI, CERC, CFBP | A written report on Role of Consumer Agencies like CGSI/ CERC/CFBP in consumer protection.<br>10 Marks<br><br>Procedure for Redressal for a consumer problem.<br>15Marks |

**EVALUATION**:

1) On Four Modules of 25 marks
2) External examination - 75 marks
3) Total : Internal - 25 + External - 75 = 100 marks

**REFERENCES:**


1. AggarwalAnju D. – "A practical Handbook for Consumers",1989, India Book House (Pvt) Ltd. Mumbai, India.
2. C.N.Sontakki, R.G. Deshpande – "Marketing, Salesmanship and Advertising" – Kalyani Publishers, New Delhi – Ludhiana, 1984.
3. Dr. S.C.Saxena – "Business Administration and Management".

4. Kotler Philip – Principles of Marketing – Prentice Hall of India Pvt. Ltd, New Delhi, 1985.
5. Nair Suja – "consumer Behaviour" – Text and Cases – Himalaya Publishing House, 1999.
6. Niraj Kumar – "Consumer Protection in India" – Himalaya Publishing House, New Delhi.
7. S.A. Chunawala – "Commentary on consumer Behaviour" – Himalaya Publishing House, New Delhi.
8. S. A. Sherlekar, P.N. Reddy, H.R. Appannaiah – "Essentials of Marketing Management" - Himalaya Publishing House, Mumbai, 1995.
9. S.S. Gulshan – "Consumer Protection and Satisfaction" – wileyEastem Ltd, New Delhi, 1996.
10. Sheth J.N. – "Model of Industrial Behaviour". Journal of Marketing 1973, 37 [4].
11. Sundaram I.S. – "Consumer Protection in India" – B.R. Publishing Corporation, Delhi, 1985.
12. V.S. Ramaswamy, S.Namakumari, - "Marketing Management", Second Edition, McMillian India Ltd, New Delhi, 1997.

## Semester III
## Family Dynamics

**OBJECTIVES:**

1. To sensitize the student towards marriage and family life.
2. To understand the traditional and changing norms of the institution of the family with reference to its social environment.
3. To get familiar with the concept of marriage and the areas of adjustments within the family
4. To becomes aware about dynamics of family interactions and developmental tasks through family life
5. To becomes aware of problems in families and ways of coping

| Course | TC | Th C | Pr C | Int M | Ext M | Total |
|---|---|---|---|---|---|---|
| **Family Dynamics** | 4 | 3 | 1 | 25 | 75 | 100 |

(THEORY)

| Module No | Objective | Content | Evaluation |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1 | This will enable students to:-<br>1. To analyze the traditional and changing norms of institution of family.<br>2. Be sensitive to variations in family practices of different ethnic groups.<br>3. Understand stages of family life cycle.<br>4. Create insight about the types of family.<br>5. Identify alternate family patterns.<br>6. Explore the dyadic relationships in family.<br>7. Analyze the areas & patterns of adjustments<br>8. Bring awareness & sensitize oneself about crisis in family life. | **Family & its structure**<br>1. Meaning of the term family<br>• Family composition & structure<br>• Practices & Patterns of family<br>• Changing family patterns<br>2. Family life cycle: meanings, definition & stages.<br>3. Types of family<br>4. Alternate family patterns: Causes, characteristics & implications.<br>5. Dyadic relationships<br>Family Responsibilities<br>**Adjustments & Crises within the family**<br>1. Areas & patterns of Adjustment<br>2. Meaning of crisis ; Types of family crises & ways of coping | Use of experientia l method by students: Role play, skit. etc.<br>5 marks<br><br>Poster making and exhibition<br>5 marks |

| Module No. | Objective | Content | Evaluation |
|---|---|---|---|
| 2 | This will enable students to:-<br>1. To understand the institute of marriage<br>2. Develop awareness in mate selection process.<br>3. Understand the goals of modern marriage.<br>4. Know and realize the importance and need for pre & post marital counseling.<br>5. Create deeper insight into the concept of engagement.<br>6. Understand the functions of traditional marriage.<br>7. Gain knowledge about types of marriage. | **Marriage**<br>1. To understand the concept of "Marriage as an Institution"<br>2. Mate Selection<br>3. Goals of modern marriage<br>4. Preparing oneself for marriage<br>5. Pre marital and post marital counseling<br>6. Engagement<br>7. Marriage rituals & Court marriage<br>8. Honeymoon<br>9. Annulment & Divorce & Marriage Counselling | Group presentation on any above topics,<br>10 marks |

| Module No. | Objective | Content | Evaluation |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 3 | This will enable students to:-<br>1. Understand know how of Planned Parenthood.<br>2. Get acquainted with family planning methods. | **Planned Parenthood**<br>1. Concept & significance of Planned Parenthood.<br>2. Joys and hazards of parenting<br>3. Birth control<br>4. Parenthood (parenting at different ages) | Guest Lecture on family planning methods followed by objective test.<br>5 marks |

**EVALUATION**:

1) Internal : Continuous evaluation on Four Modules = 25 marks
2) External examination -75 marks
3) Total : Internal - 25 + External - 75 = 100 marks

(PRACTICAL)

| Module No. | Objectives | Content | Evaluation |
|---|---|---|---|
| 4 | This will enable students to -<br>1. understand and become aware about different alternate families<br>2. have an exposure through media<br>3.get acquainted with different family planning methods<br>4. get knowledge and aware about pre and post marital counseling | **Family and its structure**<br>1a. Survey report: different alternate families.<br>1b. Role play and skits<br>2.Films ,Movies, Review of the tele-serials presenting/ focusing families<br>3. Guest lecture and resource person.<br>4.seminar and workshops on counseling | 5marks<br>5marks<br>5marks<br>10marks |

**REFERENCES :**


Benokraitis, V. N. (2011). Marriages and Families: Changes, Choices and Constraints, 7th edition, Prentice hall, New Jersey.

Blood, Robert and Wolfe (1960). Husband and Wife: Dynamics of Married Life, Free Press, New York.

Coleman, C.J. (1988) Intimate Relationships, Marriage &Family (2nd Ed.). New York: Macmillan Publishing Company.

Duvall, E.M. (1977). Marriage and Family Development, 5th edition, Lippincott Co. Philadelphia.

Dyer, E.D. (1983). Courtship, Marriage and Family, American Style, the Dorsey Press, Illinois.

Edward, N.J. & Demo, H.D. (1991). Marriage and family transition. London: Allyn & Bacon.

Gore, (1969). Urbanization and Family Change, Popular Prakashan, Bombay.

Henslin, J. M. (ed.) (1989). Marriage and Family in a Changing Society, The free press, U.S.A.

## Semester III
## Media Skill Development

**Objectives:**

1. To develop awareness about various forms of mass media.
2. To analyze the role of media in educating the masses.
3. To acquire the skills to design messages for communication
4. To develop skills in preparing and presentation of the different forms of media

| Course | TC | Th C | Pr C | Int M | Ext M | Total |
|---|---|---|---|---|---|---|
| **Media Skill Development** | 4 | 3 | 1 | 25 | 75 | 100 |

| Module No. | Objectives | Content | Evaluation |
|---|---|---|---|
| 1 | 1. Develop awareness of the need and importance of Mass-Media.<br>2. Analyze the relationship between media and message.<br>3. Learn writing for different media. | **<u>Mass Media</u>:**<br>1. Concept of Mass Media, its importance and its role in development of society.<br>2. Relationship of Medium and Message.<br>3. Writing for different Media. | Continuous assessment and project 25 marks |

| Module No. | Objectives | Content | Evaluation |
|---|---|---|---|
| 2 | 1. Become aware of different forms of media.<br>2. Understand the role and importance of print, electronic, new and traditional media for development.<br>3. Be able to select the appropriate form of media for Extension activities. | **<u>Forms of Media</u>:**<br>1. Print Media- Newspapers, Magazines, Periodicals.<br>2. Electronic Media- Television, Radio, films.<br>3. New Media- Cell phones and Internet.<br>4. Traditional Media- Folk Media including puppetry. | Continuous assessment 25 marks |

**EVALUATION:**
Internal :Continuous evaluation - 25 Marks
External : 75 Marks
Total : Internal - 25 + External - 75 = 100 marks

| Module No. | Objectives | Content: | Evaluation |
|---|---|---|---|
| 3 | This module will enable students to:<br>1. Understand how to identify and analyze articles on social issues in print media.<br>2. Be able to analyze the content and form of electronic media.<br>3. Develop the skill of preparing A.V. clipping | **Forms of Media:**<br>1. Identify and analyze articles on social issues in Newspapers, Periodicals and Magazines.<br>2. Analysis of the content and form of Television Programmes.<br>3. Preparation of clippings on contemporary issues. | 5 marks<br>5 marks<br>10 marks |

| Module No. | Objectives | Content: | Evaluation |
|---|---|---|---|
| 4 | This will enable students to:<br>1. Develop skills in writing for print media.<br>2. Be able to develop programme for radio.<br>3. Acquire skills in preparing the different forms of traditional media. | **Media Skills:**<br>1. Planning and writing an article for Newspapers, Magazines on developmental issues.<br>2. Preparing a format for radio programme.<br>3. Preparation and presentation of traditional media- puppets and Street plays. | 7 marks<br>8 marks<br>15 marks |

**REFERENCES:**


1. Kumar, K. J. (2001) Mass Communication in India, Jayco Publishing House, Mumbai
2. Modi, Bella (1991) Designing Messages for Development Communication- audience participation based approach, Sage Publication, New Delhi
3. Raidu C.S. (1993) Media and Communication Management, Himalaya Publishing House, New Delhi

**Semester III**

**Fabric Ornamentation & Accessory Design**

**OBJECTIVES:**

1. To familiarize the student with the role and application of various types of accessories used in Fashion Business.
2. To get acquainted with various materials used as accessories.
3. To learn to mix match different materials and accessories to suit.

| Course | TC | Th C | Pr C | Int M | Ext M | Total |
|---|---|---|---|---|---|---|
| **Fabric Ornamentation & Accessory Design** | 4 | - | 4 | 100 | - | 100 |

| Module No. | Objective | Content | Evaluation |
|---|---|---|---|
| 1 | 1.To learn various embroidery stitches<br>2.To learn various painting techniques<br>3.To learn application of beads, sequences etc. | Fabric ornamentation by Embroidery/ fabric painting.<br>To make any two articles with given techniques.<br>1. Kantha / Kasuti embroidery on dupatta/stole. **OR**<br>2. Satin embroidery on dupatta/ stole.<br>1. Fabric painting on handkerchiefs/ Table cover/ Apparel **OR**<br>2. Tie and dye on scarf/ dupatta/ stole | For any two articles or applications 15+10 marks (25 Marks) |

| Module No. | Objective | Content | Evaluation |
|---|---|---|---|
| 2 | 1. To learn various knots of macramé.<br>2.To learn various techniques of | **Ornamentation**<br>To make any two articles with suitable techniques.<br>1. Smocking technique on cushion cover OR | 25 Marks<br><br>For any two articles or applications |

| | | | |
|---|---|---|---|
| | crochet<br>3. To learn technique of appliqué/patch work. | 2. Bag/ purse with appliqué work/patch work. OR<br>3.Waist belt by Macrame OR<br>4. Edgings with crochet dupatta/ handkerchief/ sleeve/neck lines. | 15+10 marks (25 Marks) |

| Module No. | Objective | Content | Evaluation |
|---|---|---|---|
| 3 | 1. To learn various methods of making jewelry.<br>2. To learn finishing techniques.<br>3. To learn to use various materials for making jewelry | **Fashion Jewelry/Shoe decoration** To make any one set of jewelry (necklace, bangle/bracelet, earrings) with suitable material. (Traditional or funky type) OR Shoe decoration with suitable technique. | 25 Marks<br><br>For any one article or application |

| Module No. | Objective | Content | Evaluation |
|---|---|---|---|
| 4 | To apply learned technique to make the article | **Best of waste**<br>Any article by using textile material. For example - borders /jean fabrics, dupatta, left over fabric pieces, etc. to make wall hangings or decorative pieces, etc. | 25 Marks<br><br>For selection of article and application |

**EVALUATION:**

1. Continuous internal evaluation of 100 marks (each module 25 marks)
2. No Externals to be conducted.

**REFERENCES**:

| S. No. | Title of the Book | Author |
|---|---|---|
| 1 | Anchor-educational service-(2007 & 2008 series) | |

| | | |
|---|---|---|
| 2 | Anchor needle & thread (2007 & 08 series) | |
| 3 | The step by step Art of Ribbon work | Anita Aarrison |
| 4 | The complete book of needle craft | Caroline Ollard |
| 5 | Making leather handbags | Ellen Goldstein Lyrich Sarah, & Micole Malone |
| 6 | The new needle craft project book | Lucinda Ganderton |
| 7 | Creative crochet | Locias Calder's |
| 8 | Fabulous Fabrics | Mary Jo Hinely |
| 9 | Making handbags—Retro/Chic/Luxurious | |
| 10 | Complete guide to crochet | Pam Dawson |

## Semester IV
## Advanced Chemistry

**OBJECTIVES:**

**The course will enable students to:**

1. Lay the foundation of biological chemistry.
2. Give insights about the chemical reactions that occur in biological systems.
3. Impart knowledge about the structures of the principle components present in biological systems.

| | Course | Th | Pr | Total | Int | Ext | Total |
|---|---|---|---|---|---|---|---|
| | Advanced Chemistry | 2 | 2 | 4 | 25 | 75 | 100 |

## Advanced Chemistry Theory

| Module No | Objectives | Content | Evaluation |
|---|---|---|---|
| **1** | This module will enable students to:<br>**1)** Understand the fundamentals of carbohydrates and their importance in metabolism.<br>**2)** Understand importance of lipids and their role in biological systems. | **Carbohydrates:**<br>• General formula, Classification, Structure, properties and uses of monosaccharides (Glucose, Fructose), disaccharides (Lactose, Maltose and Sucrose), oligosaccharides, and polysaccharides (Starch, Glycogen).<br>• Introduction to the structure of D & L forms. Optical and stereo isomers. Anomers. Cyclic forms of monosaccharides of glucose and fructose including structures. | 25 Marks<br>Assignments<br>Quiz |

| | | | |
|---|---|---|---|
| | | • Reactions of Monosaccharids- Oxidation and reduction reactions, esterification reaction, osazone formation<br>**Lipids:**<br>• Definition and Introduction, Structural formula and difference between saturated and unsaturated fatty acids,<br>• Chemical Constants of fats-iodine value, saponification value, acid value and Richert- Miesel numbers.<br>• Rancidity<br>Sterols-Structure and function of cholesterol, 7 dehydro- cholesterol and ergosterol. | |
| **2** | **1)** Understand the fundamentals of proteins and nucleic acid chemistry.<br><br>**2)** Know the role of enzymes and factors that affect enzyme actions. | **Proteins:**<br>• Classification of amino acids with structure.<br>• Zwitter ionic form.<br>• Peptide bond.<br>• Structure of proteins (primary, secondary, tertiary and quaternary structure.<br>• Denaturation of proteins.<br>• Salting out of proteins and isoelectric precipitation.<br><br>**Nucleic Acid Structure:**<br>**Enzymes:**<br>• Definition, general properties, Nomenclature, classifications and specificity.<br>• Mechanism of enzyme action.<br>• Factors affecting enzyme activity.<br>• Enzyme inhibition-competitive and non competitive.<br>Coenzymes and isoenzymes and their role in metabolism. | 25 Marks<br>Assignments<br>Quiz |

**References :** 3, 4, 6, 7 & 9

## Advanced Chemistry Practical

**OBJECTIVES:**

**The course will enable students to:**

1. Impart practical training in chemistry.
2. Develop understanding of the fundamentals of chemical reactions through hands on training.
3. Impart the necessary knowledge in identification of important compounds in biological systems.

| Module No | Objectives | Content | Evaluation |
|---|---|---|---|
| **1** | This module will enable students to: Apply the basic knowledge of chemical reactions. | Preparations of basic solutions for titration:<br>1. Preparation of standard solution of NaOH and $H_2SO_4$ (Strength of 1N – 0.1N or 0.25N or 0.5N etc.), Calculations for normality, morality and g/l concentration.<br>2. Oxidation reduction titration-<br>A) Ferrous ammonium sulphate with $K_2Cr_2O_7$<br>B) $KMnO_4$ with oxalic acid.<br>Using a standard solution of $KMnO_4$and Na OH determine the strength of a mixture of $H_2SO_4$ and $H_2C_2O_4$. $2H_2O$. | 25 Marks Practical test |
| **2** | This module will enable students to:<br><br>Apply theoretical knowledge of carbohydrate, proteins and lipid chemistry**.** | 1. Qualitative analysis of carbohydrates, Glucose, fructose, sucrose, lactose, maltose, starch.<br>2. Estimation of glucose by DNSA (colorimetric method)<br>3. Estimation of sucrose using Benedict's Quantitative method.<br>4. Qualitative tests for proteins (colour reactions and precipitation reactions)<br>Qualitative tests for fats. | 25 Marks Practical test |

**References :** 1, 2 and 3

**References:**


1) Finar I.L. "Organic Chemistry Vol. I" 6th Edition, (2009), Pearson Education India.
2) Finar I.L "Organic Chemistry, Volume 2": Stereochemistry and the Chemistry of Natural Products, 5th Edition, 2009.
3) Rastogi S.C. "Biochemistry", 2nd Edition, (2003) Tata MacGraw Hill Publishing Co. Ltd.
4) Jain, J, L., S. Jain and N. Jain. "Fundamentals of Biochemistry". 6th Edition, (2005). S.Chand Company Ltd.
5) Plummer, D.T., "An Introduction to Practical Biochemistry". 2nd Edition, (1971) McGraw-Hill Publishing Co. Ltd.
6) Apps D.K. and Cohen B.B. and Steel C.M. "Biochemistry: A Concise Text for Medical Students" (1992), Bailliere Tindall,
7) Debajyoti D, "Biochemistry" 2nd Edition, (1980) Academic Publishers,.
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9) Chatterjee M.N., Shinde R. "Textbook of Medical Biochemistry" 8th Edition (2012) Jaypee Brothers, Medical Publishers.
10) Vasudevan D.M. and Sreekumari S – (2007) "Textbook of Biochemistry for Medical Students". 5th Edition, Jaypee Brothers, Medical Publishers.
11) "Murray Harper's Illustrated Biochemistry" 29th Edition, (2012) Prentice Hall Int.
12) Voet D, and Voet J.G "Biochemistry" 4th Edition. (2011), *John Wiley & Sons.*
13) Nelson DL & Cox MM. 5th Edition, 2009. "Lehninger's Principles of Biochemistry". Freeman and Co.
14) Berg J.M. Tymoczko J.L., and Stryer. L. "Biochemistry", 5th edition, (2002). W.H. Freeman.
15) Mendham J., RC Denney - Vogel's textbook of quantitative chemical analysis – Pearson education ltd.
16) Textbook of practical Chemistry Std. 11 Gujarat and Maharashtra secondary education Board.

## Semester IV
## Food Microbiology

## Objectives

**The course enables the students to-**

1. **To understand the nature and the role of microorganisms in food.**
2. **To have a knowledge of the basic principles of food sanitation and safety.**
3. **To acquire a perspective of the importance of microorganisms in environmental microbiology.**

| | Subject | Total Credits | Th | Pr | Int | Ext | Total |
|---|---|---|---|---|---|---|---|
| | **Food Microbiology** | **4** | **2** | **2** | **25** | **75** | **100** |

## Food Microbiology Theory

| Module No | Objectives | Content | Evaluation |
|---|---|---|---|
| 1 | **This module will enable the students to :** | **Food Microbiology –Basic concepts and History in brief**<br>**General characteristics** | 25 Marks Assignments / Presentations |

| | | | |
|---|---|---|---|
| | 1. To be acquainted with microorganisms important in food<br><br>2. To understand their characteristics in relation to preservation and spoilage of food<br><br>3. To have a knowledge of the various sources of contamination | • Morphological Characteristics<br>• Reproductive characteristics<br>• Physiological characteristics<br>• Molds of industrial importance<br>Molds, Yeasts and Bacteria<br>Brief introduction to the following:<br>Viruses, Algae and Parasites<br>**Sources And Types Of Contamination**<br>**Water**<br>• Microbial flora- (types of micro organisms)<br>• Water -As a source of contamination<br>• Water purification<br>• Microbial examination<br>• Indicator organisms<br>• Water borne illnesses- (names)<br>• Microbial flora<br>• Sources of contamination<br><br>**Sewage**<br>• Introduction Sewage as a source of contamination<br>• Sewage treatment (brief)<br>**Air**<br>• Air micro flora<br>• Air as a source of contamination<br>**Other Sources of contamination**<br>• Humans, Pests, Animals, Birds and Inanimate objects<br>**Food safety**<br>Basic concepts of Physical, Chemical and Biological hazards associated with foods.<br>**Sanitation in Food Service Establishment**<br>1. Cleansing agents, Disinfectants & sanitizers used in Food service Establishment.<br>2. Personal hygiene<br>• The food handler<br>• Cleanliness with regard to hand, habits, working attire/cloths, jewellery,<br>• Health of a food handler<br>3. HACCP Principles, Need and benefits | |

| | | | |
|---|---|---|---|
| 2 | **This module will enable the students to :**<br>1. Understand the beneficial effects of micro-organisms<br>2. Food Spoilage and pathogenesis of micro-organisms | **Micro Organisms and Food:**<br>**Beneficial effects of microorganisms.**<br>Microorganisms responsible for commercial production of acid, alcohols, solvents, antibiotics, vitamins, hormones, enzymes, amino acid etc.<br>**1. Microbial fermentation and role of micro organisms in Food fermentations**<br>• Beer, Wine, Bread<br>• Indian pickles<br>• Fermented dairy products - curd, yoghurt and cheese<br>• Vinegar<br>Indian fermented products –idli, dhokla and khaman.<br><br>2**. Food Spoilage And Food Borne Diseases**<br><br>(1) Contamination and spoilage of cereals, grains and cereal products.<br>(2) Contamination and spoilage of meat and meat products.<br>(3) Contamination and spoilage of milk and milk products.<br>**Food Poisoning and Infections:**<br><br>Definitions and differentiation between:<br>➢ Food poisoning and infections.<br>➢ Salmonella and Botulism<br>➢ E.coli and S. aureus | 25 Marks<br><br>New research developments in fermentation technology Assignments / Presentations |

**References**


1. Frazier, W. C. and Westhoff, D. (1988) Food Microbiology .Tata McGraw-Hill
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6. Reid, G.[ed]1982.Prescott and Dunn's industrial microbiology AVI Publishing Co., Inc ., Westport ,Conn
7. Stanier, R. Y.,E. A. Adelberg and Ingraham .1976 .The microbial world .4th ed. Prentice

## Food Microbiology Practical

**Objectives**

**This course will enable students to:**

1. **To understand the principles, working and use of various equipments.**
2. **To have knowledge of the underlying principles in practical food microbiology.**
3. **To develop awareness about the different techniques used for isolation and primary identification of microorganisms.**

| Module No | Objectives | Contents | Evaluaiton |
|---|---|---|---|
| 1 | **The module will enable the student to:**<br><br>1. To have a knowledge of the commonly used staining techniques.<br>2. To make the student familiar with the various culture media | Study of laboratory equipments - Principle, working and use of Microscope, Autoclave, Incubator, Refrigerator, colony counter.<br>1. Study of motility:<br>Hanging drop preparation.<br>2. Staining techniques:<br>Simple staining<br>Gram staining<br>Spore staining<br>**Capsule staining**<br>3. Preparation of culture media composition and uses. | Performing Practical<br>15 marks |
| 2 | **The module will enable the student to:**<br><br>1. To enable students to isolate micro-organisms fro different soures.<br>2. To make a preliminary identification of some micro-organisms | **Isolation and observation of fungi**<br>1. Isolation of bacteria:<br>Using serial dilution streak plate and pour plate techniques:<br>• From air<br>• From soil<br>2. Bacteriological Analysis of Water.<br>3. Bacteriological analysis of milk.<br>4. Test for surface sanitation.<br>5. Permanent slides of pathogenic micro organisms | Performing practical<br>10 marks |

**References**


1. Frazier ,W.C, and Westhoff, D.1988 Food Microbiology. Tata Mc. Graw-Hill
2. Guthrie,R.K.[ ed] (1972)Food sanitation Inc. Eaglewood Cliff, N. J
3. Jay,1978.Modern food microbiology. Van Nostrand Reinhold Company ,New York
4. Marriot. N.G. (1995)Principles of Food Sanitation .4th edition Edward Arnold
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7. Stanier R.Y., E. A. Adelberg and Ingraham .1976 .The microbial world 4th ed. Prentice Hal

## Semester IV

## Human Nutrition I

**Objectives**

**This course will enable students to:**

1. Gain insight in to the physiological process of digestion, absorption of nutrients.
2. Acquire knowledge about the functions of nutrients.
3. Understand the implications of deficiencies and excess of the nutrients.
4. Describe the functions of water in the body and how electrolytes and fluid balance are maintained in the human body.

| | Subject | Total Credits | Th | Pr | Int | Ext | Total |
|---|---|---|---|---|---|---|---|
| | **Human Nutrition I** | **4** | **4** | **-** | **25** | **75** | **100** |

| Module No. | Objectives | Content | Assessment |
|---|---|---|---|
| **I** | **This module will enable students to:**<br>1. Know the various scientists and development in nutrition science.<br>2. Understand digestion, absorption of macronutrients.<br>3. Understand the inter-relationship between water and electrolytes and their role in maintenance of fluid balance.<br>4. Understand how the changes in fluid balance effects the human body | **History of Nutrients - Eminent Scientists and developments in Nutrition Science**<br>**Basic concepts in Human Nutrition:**<br>• Digestion,<br>• Absorption of macronutrients- Transport across cell membrane – active, passive, diffusion<br>**Water, Electrolytes and Acid-Base balance**<br>• Sources, functions and distribution, deficiencies of the following:<br>Water and Electrolytes- Sodium, Potassium and Chloride<br>• Mechanisms of water balance, electrolyte balance and Acid-Base Balance and Water Intoxication.<br>**ENERGY BALANCE:**<br>• Forms of energy<br>• measurement of energy, | **Quiz**<br>**Assignments**<br>**Projects** |

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| | | • SDA, thermogensis.<br>• BMR estimation of BMR and factors affecting BMR | |
| **II** | **This module will enable students to:**<br>1. Understand the functions, sources, effects of deficiencies and excess in the body. | **CARBOHYDRATES :**<br>• Types and functions.<br>• Sugar alcohols,<br>• Fibre - types, properties, function, role in various diseases.<br>• Computation of RDA Effects of excess and deficiency of carbohydrates | **Quiz**<br>**Assignments**<br>**Projects** |
| **III** | **This module will enable students to:**<br>1. Understand protein quality, amino acid imbalance and its implications on health. | **PROTEIN:**<br>• Classification and functions<br>• Methods of protein quality evaluation, Amino acid imbalance, nitrogen balance, antagonism and toxicity.<br>• Factors affecting protein utilization and RDA.<br>• Vegetarianism<br>• PEM - clinical and biochemical aspects. | **Quiz**<br>**Assignments**<br>**Projects** |
| **IV** | **This module will enable students to:**<br>1. Understand the role of lipids in nutrition and health<br>2. Understand the inter-relationship between the macronutrients | **LIPIDS :**<br>• Types of lipids<br>• Metabolism<br>• Hydrogenation, fatty acids, lipoproteins.<br>• Functions, role of fat in cardio-vascular diseases.<br>• RDA<br>• Inter relation between carbohydrate, fat and protein in energy metabolism.<br>• Starvation, excess of macronutrient. | **Quiz**<br>**Assignments**<br>**Projects** |

**References**

1. Passamore R. and M.A. Eastwood (1986): Human Nutrition and Dietetics, EWBS, Churchill.
2. Guthrie H. (1986) Introductory Nutrition, Times Mirror College Publication, Toronto, Canada.
3. Swaminathan M., (1985) Advanced Text book on Food and Nutrition Vol.-I & Vol. – II, BAPPCO, Bangalore.
4. Chaney M.S., M.L., (1979) Nutrition, 9th edition, Boston, Houghton Mifflin Co.
5. Bamji M.S., Rao N.P., Reddy V., (2003) Textbook of Human Nutrition, Oxford and IBH Publishing co. Ltd., New Delhi.
6. Agarwal A and Udipi SA. (2013) Text Book of Human Nutrition, Jaypee Publihers, New Delhi.

## Semester IV

## Food Analysis

**Objectives:**

**This course will enable the students:**

1. **To aquire basic skills to do laboratory work.**
2. **To know general principles involved in instrumental method.**
3. **To understand the principles involved in the estimations.**
4. **To analyze different food components or constituents.**
5. **To use simple tests to detect food adulterants from commonly consumed foods.**
6. **To be familiar with the qualitative standards and specifications laid down by Food Safety and Food Standards Authority of India.**

| | Subject | Total Credits | Th | Pr | Int | Ext | Total |
|---|---|---|---|---|---|---|---|
| | **Food Analysis** | **4** | **-** | **4** | **25** | **75** | **100** |

| Module No | Objectives | Content | Assessment |
|---|---|---|---|
| **1** | **This module will enable students to:**<br>1. Understand the significance of food analysis.<br>2. Learn about sampling, and the techniques used in sampling. | **Introduction to food analysis and its importance.**<br>**Sampling**<br>Definition of sampling<br>Sampling methods/ techniques.<br>Sampling Techniques in food analysis<br>General classification of sampling methods.<br>Advantages and disadvantages of Sampling<br>Best sampling technique for particular foods | **25 Marks**<br><br>**Quiz**<br>**Journal**<br>**Assignments on working principles of various instruments** |

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| | 3. Have knowledge about various instruments used in food analysis. | **General instrumental methods -** Working principles and uses of various laboratory instruments used in food analysis-Colorimeter, Spectrophotometer, centrifuge, Kjeldahl's apparatus for protein estimation, Soxhlet apparatus for fat estimation, different balances, Muffle furnace, water bath, glass distillery unit. | **Performing practical**<br>**Viva** |
| **2** | **This module will enable students to:**<br><br>1. Know analytical methods used in estimation of proximate principles.<br>2. Determine the chemical constants of fats and oils and understand the significance.<br>3. Know the food standards laid down by FSSAI. | **Quantitative Analysis of proximate principles:**<br>Estimation of moisture by AOAC method.<br>Estimation of crude fat/oil by solvent extraction method. (Demonstration only)<br>Estimation of total ash by A.O.A.C. method of ashing.<br>Estimation of protein by Macrokjeldahl method. (Demonstration only)<br>**Chemical constants of fats and oils.**<br>Determination of Acid value.<br>Determination of Saponification value.<br>Determination of Iodine value. | **25 Marks**<br>**Quiz**<br>**Journal**<br>**Assignments**<br><br>**Performing practical**<br>**Viva** |
| **3** | **This module will enable students to:**<br><br>Learn analytical methods used in estimation of various food components. | **Estimation of Food Components**<br>Estimation of total and free sugar from honey by Benedict's/ Lane and Eynon's quantitative reagent method**.**<br>Determination of Ascorbic acid (Vit.C) from food sources by 2, 6, dichlorophenol indophenol method.<br>Estimation of sodium chloride (NaCl) salt from butter by Mohr's titrimetric method.<br>Estimation of calcium by titrimetric method (Clerk & Collips)**.**<br>Estimation of phosphorus by Fiske and Subbarao's or Vandate-Molybdate colorimetric method. | **25 Marks**<br>**Quiz**<br>**Journal**<br>**Assignments**<br><br>**Performing practical**<br>**Viva** |

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| | | Estimation of Iron by dipyridyl reagent method.<br>Estimation of Acidity in milk by titrimetric method. | |
| **4** | **This module will enable students to:**<br><br>Gain knowledge about food adulterants and know methods of detection. | **Qualitative analysis of common food adulterants.** Fats & oils<br>Spices and condiments<br>Milk and milk products<br>Cereals and pulses<br>Honey and jaggery<br>Tea and coffee<br>Sweets and confectionary | **25 Marks**<br>**Quiz**<br>**Journal**<br>**Assignments**<br><br>**Performing practical**<br>**Viva** |

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1. Harold Egan, Ronald S. Kirk, Ronald Sawyer, David Pearson (1981)"Pearson's Chemical Analysis of Foods. 8th Edition,. Churchill Livingstone.
2. C. Gopalan, B V Rama Sastri; S C Balasubramanian " Nutritive Value of Indian Foods." 6th Edition, 1996, Reprinted 2011. National Institute of Nutrition, Hyderabad.
3. "Official Methods of Analysis, of AOAC INTERNATIONAL", 18th Edition, 2005, AOAC INTERNATIONAL.
4. N. Raghuramulu, K. Madhavan, S. Kalyanasundaram (2003) "A Manual of Laboratory Techniques", 2nd Edition, National Institute of Nutrition.
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6. Manual of Methods of Analysis of Foods. Directorate General of Health Services, Ministry of Health and Family Welfare Government of India, 2005.
7. Morris Boris Jacobs (1951)"The Chemical Analysis of Foods and Food Products". 2nd Edition, 1951. D. Van Nostrad Company ,

# Semester IV
# Food Preservation

## Objectives

**The course enables students to:**

1. **Understand the basic principles of food preservation.**
2. **Learn the various preservation techniques and their applications.**

| | Subject | Total credits | Th | Pr | Int | Ext | Total |
|---|---|---|---|---|---|---|---|
| | **Food Preservation** | **4** | **3** | **1** | **25** | **75** | **100** |

**Food Preservation Theory**

| Modules | Objectives | Content | Assessment |
|---|---|---|---|
| **1** | This enables the students to:<br>1. Understand the need and scope for food preservation<br>2. Understand the basic principles underlying food preservation | 1. Introduction to Food Preservation Importance and objectives of food preservation and traditional methods of food preservation.<br>2. Factors affecting post-harvest storage stability of foods.<br>3. Basic principles of Food Preservation<br>4. Causes of food spoilage-growth and activity of microorganisms and insects.<br>5. Action of enzymes and chemical reactions.<br>6. Physical changes in cereals, pulses, fruits and vegetables. | **25 marks**<br><br>**Work Sheet/ assignment Problem solving** |
| **2** | This enables the students to:<br>1. Understand the various methods of food preservation involving temperatures | **Methods of Food Preservation involving temperatures-**<br>a. Asepsis and removal of micro-Organisms<br>b. Use of high temperature<br>Factors affecting heat resistance, TDT and Pasteurization<br>Canning and its use in food industry<br>c. Use of low temperature- Freezing, frozen storage, blanching, changes during storage and thawing.<br>d. Drying or dehydration- factors | **25 marks**<br><br>**Work Sheet/ assignment Problem solving** |

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| | | affecting dehydration, pretreatments and post treatments, different techniques of dehydration. | |
| **3** | This enables the students to:<br><br>Understand other methods and use of preservatives or combination of methods for preserving different kinds of foods | **Other Methods of Food Preservation-**<br>a. Use of preservatives<br>Class I and Class II preservatives and developed preservatives.<br>b. Irradiation and applications in for various foods, advantages and disadvantages.<br>Other methods- microwave heating, hurdle technology, wax emulsion | **25 marks**<br><br>**Work Sheet/ assignment Problem solving** |

**References:**


1. Frazier W. & Westhoff. D. (1988): Food Microbiology, Tata McGraw- Hill Publisher, New York.
2. Subbulakshmi G. and Udipi S.A. (2001): Food Processing and Preservation, New Longree K and Armbruster Johnwiley and Sons, Quantity food sanitation 4th edition
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## Food Preservation Practicals

**Objectives: This course will enable students to:**

1. Apply principles of food preservation.
2. Prepare preserved products using different preservation methods.

| Module No | Objectives | Content | Evaluation |
|---|---|---|---|
| 4 | **This module will enable students to:**<br><br>1. Understand and observe the role and mode of action of sugar as a preservative.<br><br>2. Understand and observe the role and mode of action of other preservatives and other techniques of preservation.<br><br>3. Get hands-on experience in preparation of various preserved products. | Introduction to Food Preservation – aseptic handling in lab.<br><br>Preparation of products using sugar as the main preservative:<br>Preparation of products using other preservatives:<br><br>Pickles<br><br>Tomato Products<br><br>Other Sauces<br><br>Masalas and dry chutney<br><br>Freezing of fruits and vegetables<br><br>Dehydrated foods<br><br>Visit to canning, cold storage plants and various industries | 25 Marks Continuous Evaluation<br><br>Report on visit to food processing industry |