



ಕ್ರಮಾಂಕ/No. :MU/ACC/CR.18/2019-20/A8

ಕುಲಸಚಿವರ ಕಛೇರಿ  
ಮಂಗಳಗಂಗೋತ್ರಿ - 574 199  
Office of the Registrar  
Mangalagangothri - 574 199  
ದಿನಾಂಕ/Date: 09.12.2021

### NOTIFICATION

Sub: Revised Syllabus of V & VI Semester B.Sc Degree  
Programme in Home Science (B.Sc -H.Sc) under choice Based  
Credit System -reg

Ref: Decision of the Academic Council meeting dated: 27.10.2021 vide  
Agenda No:2:7(2021-22)

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Pursuant to the above, the Revised syllabus of B.Sc Degree Programme in Home Science (B.Sc -H.Sc) under choice Based Credit System which was approved by the Academic Council at its meeting held on 27.10.2021 is hereby notified for implementation to V & VI semester with effect from the academic year 2022-23

Copy of the Syllabus shall be downloaded from the Mangalore University Website.  
[www.mangaloreuniversity.ac.in](http://www.mangaloreuniversity.ac.in)

  
REGISTRAR.  
4 2 6

To:

1. The Principals of all the Colleges concerned.
2. The Registrar (Evaluation), Mangalore University.
3. Smt. Gayathri K., Chairperson, UG BOS in Home Science, Mangalore University, Besant Women's College, Mangaluru.
4. The Assistant Registrar/The Superintendent, Academic Section, O/o the Registrar, Mangalore University.
5. The Director, DUIMS, Mangalore University - with a request to publish in the Website.
6. Guard File.

**B.Sc. - HOME SCIENCE**

**CHOICE BASED CREDIT SYSTEM**

## **PREAMBLE:**

Home Science is a subject that helps each and everyone to develop themselves and in turn helps in the national development. Home Science promotes the capacity of an individual and country for social and economic empowerment.

## **AIMS AND OBJECTIVES OF THE PROGRAMME:**

Aims: Home Science education helps :

- To develop individual personality
- To understand the changing needs of the individual, family and society
- To inculcate the sense of social responsibility

## **OBJECTIVES:**

The objectives of B.Sc (CBCS) Home Science course are as follows: By studying this course the student:

- Develops a balanced personality to become self-reliant and confident citizens of the country
- Acquires skills for the empowerment of a student in particular and community in general
- Acquires knowledge to protect the environment
- Acquires knowledge and competence to teach and practice Home Science subjects
- Develops and practice the skills to oneself and the community to enhance the quality of life.

## **SCOPE AND JOB OPPORTUNITIES**

Many job opportunities exist for students of Home Science. Some of the essential ones are listed below:

- Students can join as Junior Scientists in Food and Agriculture, Textile Industry, Home Management and Interior Decoration, Different Aspects In Human Life Cycle, etc.
- Food Analyst and Inspectors in Food Industry
- Dietitians in Hospitals, Nursing Homes and Health Clubs
- House keepers in Hospitality Industry
- Interior Designers
- Fashion Designers
- Textile Designers in Textile Industry, Merchandisers'
- ICDS Project Officers, Block Development Officers and Anganwadi Workers

- Officers in Social Welfare, Women and Child Welfare, Extension Departments, And Health Departments
- Child Psychologists
- Family Counselors
- Geriatric Care Takers in Hospitals, Old Age Homes etc.
- Human Resource Persons
- Self – Employment

**MANGALORE UNIVERSITY**  
**B.SC. HOME SCIENCE**  
**CHOICE BASED CREDIT SYSTEM (CBCS)**  
**SCHEME AND SYLLABUS**

Group & Sem	Code	Course	Instructi on hrs/ week	Duration of Exam (hrs)	Marks			Credits	Total/ Sem
					IA	Exam	Total		
<b>I SEMESTER</b>									
I	BSHHSC131	Textile Science – I	4T	3	20	80	100	2	2
	BSHHSC 132	Basic Nutrition – I	4T	3	20	80	100	2	2
	BSHHSC 133	Human Physiology– I	4T	3	20	80	100	2	2
	BSHHSC 134	Textile Science – I	3P	3	10	40	50	1	1
	BSHHSC 135	Basic Nutrition – I	3P	3	10	40	50	1	1
	BSHHSC 136	Human Physiology– I	3P	3	10	40	50	1	1
II	<b>ELECTIVE</b>								
	BSHHSE137	Basic Psychology	2T	2	10	40	50	1	1
	<b>OR</b>								
	BSHHSE138	Textiles and Clothing	2T	2	10	40	50		
III Foundation Course	a. <b>Languages</b> Any Two		2L	2x3	2x20	2x80	2x100	2x2	4
	b. <b>Elective Foundation</b> BSHCIF131		1T	2	10	40	50	1	1
IV	EC & CC		1T	2	50	-	50	1	1
									16

(T-Theory, P-Practical)

Group & Sem	Code	Course	Instruction hrs/ week	Duration of Exam (hrs)	Marks			Credits	Total/ Sem
					IA	Exam	Total		
<b>II SEMESTER</b>									
I	BSHHSC181	Textile Science–II	4T	3	20	80	100	2	2
	BSHHSC182	Basic Nutrition–II	4T	3	20	80	100	2	2
	BSHHSC183	Human Physiology–II	4T	3	20	80	100	2	2
	BSHHSC184	Textile Science – II	3P	3	10	40	50	1	1
	BSHHSC185	Basic Nutrition–II	3P	3	10	40	50	1	1
	BSHHSC186	Human Physiology–II	3P	3	10	40	50	1	1
II	<b>ELECTIVE</b>								
	BSHHSE187	Research Methodology	2T	2	10	40	50	1	1
	<b>OR</b>								
	BSHHSE188	Child Development	2T	2	10	40	50		
III	<b>a. Languages</b> Any Two	2L	2x4	2x3	2x20	2x80	2x100	2x2	4
Foundatio n Course	<b>b. Elective Foundation</b>  BSHHGF181	1T	2	2	10	40	50	1	1
IV	EC & CC	1T	2	2	50	-	50	1	
									<b>16</b>

Group & Sem	Code	Course	Instruction hrs/week	Duration of Exam (hrs)	Marks			Credits	Total/ Sem
					IA	Exam	Total		
<b>III SEMESTER</b>									
I	BSHHSC231	Apparel Designing	4T	3	20	80	100	2	2
	BSHHSC232	Community Nutrition	4T	3	20	80	100	2	2
	BSHHSC233	Chemistry I	4T	3	20	80	100	2	2
	BSHHSC234	Apparel Designing	3P	3	10	40	50	1	1
	BSHHSC235	Community Nutrition	3P	3	10	40	50	1	1
	BSHHSC236	Chemistry I	3P	3	10	40	50	1	1
II	<b>ELECTIVE</b>								
	BSHHSE237	Tourism Administration	2T	2	10	40	50	1	1
	<b>OR</b>								
	BSHHSE 238	Nutrition and Dietetics	2T	2	10	40	50		
III	a. <b>Languages</b> Any Two	2L	2x4	2x3	2x20	2x80	2x100	2x2	4
	b. <b>Elective Foundation</b> BSHGEF231	1T	2	2	10	40	50	1	1
IV	EC & CC	1T	2	2	50	-	50	1	
									16

Group & Sem	Code	Course	Instruction hrs/ week	Duration of Exam (hrs)	Marks			Credits	Total/ Sem
					IA	Exam	Total		
<b>IV SEMESTER</b>									
I	BSHHSC281	Life Span Development – The Early Childhood	4T	3	20	80	100	2	2
	BSHHSC282	Nutrition Management in Health & Diseases	4T	3	20	80	100	2	2
	BSHHSC283	Chemistry-II	4T	3	20	80	100	2	2
	BSHHSC284	Life Span Development – The Early Childhood	3P	3	10	40	50	1	1
	BSHHSC285	Nutrition Management in Health & Diseases	3P	3	10	40	50	1	1
	BSHHSC286	Chemistry II	3P	3	10	40	50	1	1
II	<b>ELECTIVE</b>								
	BSHHSE 287	Food & Nutrition	2T	2	10	40	50	1	1
	<b>OR</b>								
	BSHHSE 288	Resource Management & Interiors	2T	2	10	40	50		
III	<b>a. Languages</b> Any Two	2L	2x4	2x3	2x20	2x80	2x100	2x2	4
	<b>b. Elective Foundation</b> BSHESF281	1T	2	2	10	40	50	1	1
IV	EC & CC	1T	2	2	50	-	50	1	1
									16



Group & Sem	Code	Course	Instruction hrs/week	Duration of Exam (hrs)	Marks			Credits	Total/ Sem
					IA	Exam	Total		
<b>V SEMESTER</b>									
I	BSHHSC331	Life Span Development – Schoolage to Adulthood	3T	3	20	80	100	2	2
	BSHHSC332	Interior Decoration & Etiquette	3T	3	20	80	100	2	2
	BSHHSC333	Food preservation-I	3T	3	20	80	100	2	2
	BSHHSC334	Extension Education	3T	3	20	80	100	2	2
	BSHHSC335	Chemistry - III	3T	3	20	80	100	2	2
	BSHHSC336	Food Microbiology-I	3T	3	20	80	100	2	2
	BSHHSC337	Life Span Development – Schoolage to Adulthood	3P	3	10	40	50	1	1
	BSHHSC338	Interior Decoration & Etiquette	3P	3	10	40	50	1	1
	BSHHSC339	Food preservation-I	3P	3	10	40	50	1	1
	BSHHSC340	Extension Education	3P	3	10	40	50	1	1
	BSHHSC341	Chemistry - III	3P	3	10	40	50	1	1
	BSHHSC342	Food Microbiology-I	3P	3	10	40	50	1	1
									18

Group & Sem	Code	Course	Instruction hrs/ week	Duration of Exam (hrs)	Marks			Credits	Total/ Sem
					IA	Exam	Total		
<b>VI SEMESTER</b>									
I	BSHHSC381	Human Development & Family Relations	3T	3	20	80	100	2	2
	BSHHSC382	Resource Management	3T	3	20	80	100	2	2
	BSHHSC383	Personal Finance & Consumer Studies	3T	3	20	80	100	2	2
	BSHHSC384	Food preservation-II	3T	3	20	80	100	2	2
	BSHHSC385	Chemistry – IV	3T	3	20	80	100	2	2
	BSHHSC386	Food Microbiology-II	3T	3	20	80	100	2	2
	BSHHSC387	Human Development & Family Relations	3P	3	10	40	50 (Project)	1	1
	BSHHSC388	Resource Management	3P	3	10	40	50	1	1
	BSHHSC389	Personal Finance & Consumer Studies	3P	3	10	40	50	1	1
	BSHHSC390	Food preservation-II	3P	3	10	40	50	1	1
	BSHHSC391	Chemistry – IV	3P	3	10	40	50	1	1
	BSHHSC392	Food Microbiology-II	3P	3	10	40	50	1	1
									18

**I SEMESTER  
TEXTILE SCIENCE - I  
THEORY**

**BSHHSC131**

**Total 48 hours  
4 hours /Week**

**Specific objectives:**

- To acquire with the basics of textiles, fibers and their properties
- To learn the various techniques by which the fabric can be created.

**UNIT - I: Introduction to Textiles** 12hrs

- Introduction and classification of textile fibers and their properties
- Production and uses of various fibers
- Natural Fibers : Cotton, Linen, Wool, Silk
- Manmade Fibers – Rayon, Nylon, Polyester, Acrylic.
- Recent trends in fibers

**UNIT – II: Study of Yarn** 12 hrs

Basic principles and process of yarn construction - Different types of Yarn, Staple, Filament, Textured and Blended Yarns, Yarn Count, Thread count, Yarn Twists, ‘S’ And ‘Z’ Twist

- Types of Yarns- Simple Yarns, Single Yarns, Ply Yarn, Cord Yarn.
- Novelty Yarns -Slub, Flake, Spiral, Loop, Knot
- Characteristics of Woven Fabrics – Warp and Weft, Grain and Selvedge.

**UNIT – III: Techniques of Fabric Construction** 12 hrs

- Introduction, Fabric Construction Process
- Woven: The Loom, Types of Looms, Parts of a Loom and its Functions  
Characteristics of Woven Fabrics, Woven fabric defects.

**UNIT IV: Weaving** 12hrs

- Basic Weaves : Plain, Twill, Satin
- Decorative Weaves : Jacquard, Dobby, Leno, Pile
- Non Woven Textiles – Knitting, Braiding, Netting, Felting
- Lace Making – Uses and types of Lace

**PRACTICALS:**  
**BSHHSC134**

**Total – 36 hours**  
**3 hrs /Week**

1. Identification of different types of Textiles Fibers : Visual , Microscopic and Burning
2. Construction of Basic and Decorative stitches
3. Use and care of sewing machine- construction of seams
4. Basic Weaves - Prepare paper samples for all the basic weaves: (one sample for each)
5. Collect the samples for the Decorative Weaves
6. Visit to Garment manufacture unit

**Course Outcomes**

- Students can join the textile industry or fabric companies
- Students can work as quality maintenance

**REFERENCES:**

1. Ziffzer – clothing construction practicals –prasaranga Mysore University
2. Hess,” Textile fibres and their use: 6<sup>th</sup> edition Oxfors& IBH publishing Co.PVt ltd., New Delhi, Bombay, Calcutta.
3. Mary, B. Cowan, Martha E. jungerman Introduction to textiles; D.B.Taraporvala sons & Company Pvt., Ltd.,
4. DurgaDaulkar, “ Household Textiles & Laundry work
5. Erwin, Mabul”Clothing for Moderns N.Y. Macmillian Publication.
6. Wingate, “Textile fabrics and their selcation” Prentice hall Englewood cliffs N.J.
7. Potter and Corbmon, “Fibre to fabric” N.Y. Gergg division and macran hill book co.
8. Dr.NaveenKaur “Comdex Fashion Design”. Vol II (2010) Dreamtech Press New Delhi
9. Dr.SushmaGuptha, neeruGarg, RenuSaini (2003)” Text Book of Clothing and Textiles” Kallyani publishers, ludhiyana, New Delhi.
10. Joseph m.L(1981)” Introductory Textiles Science” Holt Ripen hart of winstin New York.
11. D’souza N(1998) ‘Fabric care’ New Age International Pvt. Ltd. Publishers

**I SEMESTER  
BASIC NUTRITION - I  
THEORY**

**BSHHSC132**

**Total – 48 hours  
4 hrs / week**

**Specific objectives**

To enable the students to

- To Understand the Functions and Sources of Nutrients
- Apply the knowledge in maintenance of Good Health for the individual and the Community
- Be familiar with factors affecting availability and requirements

**UNIT I**

12 hrs

- Nutritional Status: The relation of good nutrition to normal health.
- Definitions of the terms – Food, Nutrition, Health, Nutrients, Nutritional status, Malnutrition.
- Methods of cooking: boiling, teaming, pressure cooking, frying and dry heat cooking
- Energy - Definition of energy, calorie and joule, Measurement of calorific values of foods: gross and physiological value of food. Basal Metabolic Rate (BMR) and Factors affecting BMR. Specific Dynamic Action (SDA) of foods. Energy needs of the body. Direct and indirect calorimeter.

**UNIT II**

12hrs.

- Carbohydrates: Classification, Digestion, Absorption, Transport, Metabolism, Functions, Sources and Requirements

**UNIT III**

12hrs.

- Proteins: Classification, Digestion, Absorption, Metabolism, Functions, Sources and Requirements. Essential and non-essential Amino Acids, Factors Affecting Bio-Availability, Supplementation and Deficiency State.

**UNIT IV**

12 hrs.

- Lipids&Fats: Classification, Digestion, Absorption, Metabolism, Functions, Sources and Requirements. Saturated and Unsaturated Fatty Acids and Effects of Deficiency.

**PRACTICALS**  
**BSHHSC135**

**Total - 36hrs**  
**3hrs/week**

- Weights and Measures
- Different methods of Cooking: Boiling, Steaming, Frying and Dry heat cooking – Demonstration each with minimum one recipe.
- Prepare weaning foods
- Prepare Protein rich recipes

**Course Outcomes**

- Students can gain knowledge on different cooking methods and techniques to improve nutritional quality of food.
- Students can work as health professionals

**REFERENCES:**

1. Guthrie, A. H., (1986) Introductory Nutrition, 6th Ed., The CV Mosby Company
2. Swaminathan, M., (1985) Essentials of food and nutrition, Vol I and II, Ganesh and Co, Madras Gopalan C (1991) Nutrition value of Indian foods, ICMR
3. WTO Technical Reports Series for Different Nutrients.
4. Robinson CH, Lawler MR, Chenoweth WL, Garwick AE (1986) Normal and therapeutic nutrition, 17th Ed., Macmillan Publ. Co.
5. Agarwal A, Udipi SA (2014) Text book of human nutrition, Jaypee Bros. Medical Publ., New Delhi
6. Bamji M, Rao NP, Reddy V (1996) Text book of Human Nutrition, Oxford and IBH Publ. Co. Pvt Ltd, New Delhi
7. Srilakshmi B (2015) Nutrition science - 4th Ed., New age international Publ., New Delhi
8. Shills ME, Shike M, Ross AC, Caballero B, Cousins RJ (2005) Modern Nutrition in health and disease – 10th Ed., Lippincott Williams and Wilkins

**I SEMESTER  
HUMAN PHYSIOLOGY- I  
THEORY**

**BSHHSC133**

**Total - 48 hrs  
4 hrs / week**

**Specific objectives**

- To understand the homoeostatic status of the human body
- To understand the physiological processes and functions as applicable to human nutrition

**UNIT I**

12 hrs

- Introduction: Cell – Structure and Function of Organelles, Nucleus, Chromosomes, Genes, Cell Division, Types of Cell Tissue Transport, Cell Junctions. Homeostasis and Body Fluids.
- Blood: Red blood cells – Erythropoiesis, Stages of Differentiation, Function, Counts, Physiological Variation.
- Hemoglobin – Structure, Function, Concentration, Physiological Variation. White Blood Cells – Production, Function, Life Span, Counts, Differential Counts. Platelets – Origin, Normal Count, Morphology, Functions.
- Plasma Proteins – Production, Concentration, Types, Albumin, Globulin, Fibrinogen. Homeostasis and Blood Coagulation.
- Homeostasis – Definition, Normal Homeostasis, Clotting Factors, Mechanism of Clotting, Disorders of Clotting Factors.
- Blood Bank - Blood groups – ABO system, Blood grouping and typing, Cross Matching. Rh system – Rh factor, Rh incompatibility.
- Blood transfusion – Indication, Universal Donor and Recipient Concept. Complications of Blood Transfusion and Cross Matching. Selection Criteria of a Blood Donor, Transfusion Reactions.
- Anticoagulants – Examples and Uses.
- Anaemia – Classification – Morphological and Etiological Effects of Anaemia on Body.
- Blood Indices – Colour Index, MCH, MCV, MCHC. Erythrocyte sedimentation rate (ESR) and packed cell volume.
- Blood volume – normal value, determination of blood volume and regulation of blood volume. Lymph – composition and function.

**UNIT II**

12 hrs

- Cardiovascular System: Heart – Physiological Anatomy, Nerve Supply, Properties of Cardiac Muscle, Cardiac Cycle – Systole, Diastole, Conduction System. Cardiac Output.
- Heart Sounds: Normal Heart Sounds, Areas Of Auscultation.

- Blood Pressure – Definition, Normal Value, Clinical Measurement of Blood Pressure.
- Physiological Variations, Regulation of Heart Rate, Cardiac Shock, Hypotension, Hypertension. Radial Pulse.
- Heart Sounds – Normal Heart Sounds, Characteristics And Signification (Significance). Heart Rate.
- Electrocardiogram (ECG) – Significance.

### **UNIT III**

12 hrs

- Digestive System: Physiological Anatomy of Gastro-Intestinal Tract, Functions of Digestive System.
- Salivary Glands – Structure and Functions, Deglutition, Mastication – Stages and Regulation of Saliva, Functions of Saliva.
- Stomach – Structure and Functions.
- Gastric Secretion – Composition, Function, Regulation of Gastric Juice Secretion.
- Pancreas – Structure, Function, Composition and Regulation of Pancreatic Juice.
- Liver – Functions of Liver.
- Bile Secretion - Composition, Function, Regulation of Bile Secretion, Bilirubin Metabolism, Types of Bilirubin, Jaundice – Types, Significance.
- Gall Bladder – Functions. Intestine – Small Intestine and Large Intestine.
- Small Intestine - Functions, Digestion, Absorption, Movements.
- Large Intestine – Functions, Digestion and Absorption of Carbohydrates, Proteins, Fats, Lipids. Defecation.

### **UNIT IV**

12 hrs

- Respiratory System: Function of respiratory system - physiological anatomy of respiratory system, respiratory tract, respiratory muscles and respiratory organs – lungs, alveoli, respiratory membrane, stages of respiration.
- Mechanism of normal and rigorous respiration, intra pulmonary pleural pressure, surface tension.
- Transportation of respiratory gases. Transportation of O<sub>2</sub>: Oxygen, Haemoglobin, Dissociation.
- Lung volumes and capacities.
- Regulation of Respiration, Mechanisms of Regulation, Nervous and Chemical Regulation,
- Respiratory Centre. Hypoxia, Cyanosis, Asphyxia, Dyspnoea, Dysbarism, Artificial Respiration, Apnoea.



**PRACTICALS:**  
**BSHHSC136**

**Total – 36 hrs**  
**3 hrs/week**

- Record of blood pressure – Sphygmomanometer, Palpatory Method, Auscultatory Method, Variation Of BP
- Haemoglobin estimation
- Blood grouping
- Histology of Cartilage, bone, adipose tissue, skin, muscle.

**Course Outcomes**

- Students will be able to record blood pressure
- Students can estimate Hb levels and can do the grouping of blood

**REFERENCES:**

1. Guyton, A. C., Hall, J. E., 1996, Textbook of Medical Physiology, 9th Ed., Prism Books Pvt Ltd., Bangalore
2. Chatterjee, C. C., 1988, Human Physiology, Calcutta, WB
3. Wilson., 1989, Anatomy and Physiology in Health and Illness, Edinburgh Churchill Livingstone
4. Sembulingam, K., Sembulingam, P., 2012, Essentials of medical physiology, Jaypee Bros. Medical Publ., New Delhi

**I SEMESTER  
ELECTIVE  
BASIC PSYCHOLOGY**

**BSHHSE137**

**Total – 24 hours  
2 hrs/week**

**Specific objectives:**

- To Understand Psychological Concepts
- To Apply Major Areas of Psychology on Application in Daily Life.

**UNIT-I:** Introduction, Memory and Learning 12 hrs

- Definition and Goals of Psychology
- Scope and Key Perspectives of Psychology
- Memory Process, Memory in Children, Causes of Forgetting, Techniques to Improve Memory Methods of Encouraging Behaviours, Coping with Undesirable Behaviours

**UNIT-II:** Social Psychology 12 hrs

Definition, Application, Social Perception, Social Influence, Pro-social Behaviours, Stereotypes Prejudice, Discrimination, Aggression.

**Course Outcomes**

- Students will gain knowledge on psychological aspects and their influence on the development of an individual. Hence they can assist children to improve their memory and can help in modifying children's behavior

**REFERENCES:**

1. Feldman, A R, Understanding Psychology IV th Edition, 1996, Mcgraw Hill, New Delhi,
2. Baron, A.R, Psychology III Edition, 1996, Prentice Hall Of India, New Delhi.
3. Morgan, King, Weisz&Schopler, Introduction to Psychology- VII Edition, 1993, Tata Mcgraw Hill, New Delhi.
4. Weiten W., Themes And Variations –III Edition and VI, 1995-2004, Cole and Thomson, USA.
5. Plotnik Rod, Introduction to Psychology. VIThEdition 2002, Wadsworth-Thomson Learning.

**I SEMESTER  
ELECTIVE  
TEXTILES AND CLOTHING**

**BSHHSE138**

**Total – 24 hours  
2 hrs/week**

**Specific objectives:**

- To know different types of fibers and its identification
- To understand different techniques of dyeing techniques

**UNIT-I**

12 hrs

- Fiber Classification – natural and synthetic
- Dyeing and Printing – Dyeing at home, Dyeing defects, Colour fastness testing, Printed fabrics imperfection.

**UNIT-II**

12 hrs

- Sewing machines – parts, threading the machine, aids to better sewing, its care and maintenance.
- Drafting and pattern making – Necklines, Collars, Sleeves.
- Clothing according to season, size, occupation and figure.

**Course Outcomes**

- Students will gain knowledge on different fibers, their identification and some important fabric pattern making skills.
- Students can work in textile industries and cloth dyeing units

**References:**

1. Dr.Mungal, R.. S., 2015, Textiles Fibre to Fabric, Satyam Publishers & Distributors, Jaipur.
2. Premalata, Mullick., 2011, Text Book of Home Science, New Delhi, Kalyani Publishers.
3. Dr.Navneet Kaur, 2010, “Comdex Fashion Design” Vol II, Dreamtech Press, New Delhi.
4. Durga Deulkar, 2002, “Household Textiles and Laundry Work.” Atma Ram & Sons Publishers.
5. Ziffzer, 1974, Clothing Construction practicals – Prasaranga Mysore University.

**II SEMESTER  
TEXTILE SCIENCE II  
THEORY**

**BSHHSC181**

**Total – 48 hrs  
4 hours/week**

**Specific objectives:**

- To acquire skills based approach with theoretical knowledge
- To gain knowledge on Basic principles of Dyeing, Printing and Finishing

**UNIT-I**

12hrs

- Sewing machine – Types Basic Models – Parts and Functions, Care and Maintenance, Common Problems and Reason.
- Finishes: Definition, purpose, classification. Mechanical Finishes, Chemical Finishes, Special Finishes.

**UNIT-II**

12 hrs

- Brief study on types of Dyes with the chemical composition and their applicability to different fabrics
- Classification of Dyes – Natural, Artificial, Acid, Basic, Vat, Azoic, Sulphur, Mordant
- Methods of dyeing – Stock, Yarn, Piece, Cross etc.
- Methods of different stages of Dyeing - Fiber, Yarn, Fabric etc
- Types of Resist Dyeing -Tye and Dye, Batik

**UNIT- III**

12 hrs

- Fundamentals of Printing - Study of Dyes and Pigments for Printing
- Difference between Dying and Printing - Types - Hand, Block, Roller, Screen, Discharge, Stencil, Spray Printing

**UNIT – IV**

12 hrs.

- Laundry Science – Process Involved, Equipment Used, Manufacturing of Soaps, Detergents and Stain Removal methods

**PRACTICALS:  
BSHHSC184**

**Total – 36 hours  
3hrs / Week**

- Skill of using sewing machine continued
- Construction process –Plackets, Fullness, Edge Finishes, Fastening (two for each)
- Preparation of Soap
- Prepare samples for - Fabric painting Block printing, Tie and Dye and Batik
- Home Apparel – Cushion Cover/ Pillow case/ Shoulder bag

**Course Outcomes**

- Students can join textile industry, garment shops, chemical industry where clothes are manufactures, dyed and printed. They can secure job in soap industries and can become a good guide in clothing industry. They can also opt for self employment by manufacturing soap, detergents etc. students can work as assistants under engineers for manufacturing design, colour specialists, consumer educator.
- They can become skilled tailors and start fabric construction

**REFERENCES:**

1. Dr.Mungal, R. S., (2015), Textiles Fibre to Fabric, Satyam Publishers & Distributors, Jaipur.
2. Premalata Mullick., (2011), Text Book of Home Science, New Delhi, Kalyani Publishers.
3. Dr.Navneet Kaur (2010) “Comdex Fashion Design” Vol II, Dreamtech Press, New Delhi.
4. Durga Deulkar (2002), “Household Textiles and Laundry Work.” Atma Ram & Sons Publishers.
5. Ziffzer (1974) Clothing Construction practicals – Prasaranga Mysore University.

**II SEMESTER  
BASIC NUTRITION – II  
THEORY**

**BSHHSC182**

**Total - 48 hours  
4 hrs / week**

**Specific objectives:**

To enable the students:

- To understand the functions and sources of nutrients
- Apply the knowledge in maintenance of good health for individual and the community.
- To be familiar with factors affecting availability and requirements

**UNIT - I** 12 hrs

- Macro minerals: Calcium, Phosphorus, Magnesium and Sodium- functions, sources, requirements and deficiency

**UNIT - II** 12 hrs

- Micro minerals: Iron, Copper, Zinc and Iodine- functions, sources, requirements and deficiency

**UNIT - III** 12 hrs

- Vitamins: Classification- fat soluble and water soluble. Thiamine, Riboflavin, Niacin, Folic acid, Vitamin B12, Ascorbic acid: functions, sources, requirements and deficiency

**UNIT - IV** 12 hrs

- Water: Importance, sources, water balance, edema and dehydration
- Dietary Fibre: Definition, classification, sources and role of fibre in nutrition.

**PRACTICALS:****Total – 36 hours****BSHHSC185****3hrs / Week**

Planning, preparing and serving the recipes rich in the following nutrients

1. Calcium
2. Iron
3. Vitamin A
4. Vitamin C
5. Thiamine
6. Niacin

**Course Outcomes**

- Students can understand the vital link between Nutrition and Health. They gain knowledge on functions, requirements and effects of deficiency of various nutrients
- Students get practical skills in planning and preparing basic nutrient rich recipes

**REFERENCES:**

1. Guthrie, A. H., 1986, Introductory Nutrition, 6th Ed., The CV Mosby Company
2. Swaminathan, M., 1985, Essentials of food and nutrition, Vol I and II, Ganesh and Co, Madras Gopalan C (1991) Nutrition value of Indian foods, ICMR
3. WTO Technical Reports Series for Different Nutrients.
4. Robinson, C. H., Lawler, M. R., Chenoweth, W. L., Garwick, A. E., 1986, Normal and therapeutic nutrition, 17th Ed., Macmillan Publ. Co.
5. Agarwal, A. and Udipi, S. A., 2014, Text book of human nutrition, Jaypee Bros. Medical Publ., New Delhi
6. Bamji, M., Rao, N. P., Reddy, V., 1996, Text book of Human Nutrition, Oxford and IBH Publ. Co. Pvt Ltd, New Delhi
7. Srilakshmi, B., 2015, Nutrition science - 4th Ed., New age international Publ., New Delhi
8. Shills, M. E., Shike, M., Ross, A. C., Caballero, B., Cousins, R. J., 2005, Modern Nutrition in health and disease – 10th Ed., Lippincott Williams and Wilkins

**II SEMESTER  
HUMAN PHYSIOLOGY - II  
THEORY**

**BSHHSC183**

**Total - 48 hrs**

**4 hrs / week**

**Specific objectives**

To enable the students.

- To understand the homeostatic status of the human body
- Understand the physiological processes and functions as applicable to human nutrition

**UNIT - I**

12 hrs

- Endocrine System: Definition, classification of endocrine glands and their hormones, properties of hormones.
- Thyroid gland hormones – regulation of secretion. Disorders – hypo and hypersecretion of hormone.
- Adrenal gland - physiological anatomy. Adrenal cortex, cortical hormones – functions and regulation.
- Adrenal medulla – hormones, regulation and secretion.
- Functions of adrenaline and nor-adrenaline.
- Pituitary hormones – anterior and posterior pituitary hormones, secretion, function.
- Pancreas – hormones of pancreas. Insulin – secretion, regulation, function and action.
- Diabetes mellitus – regulation of blood glucose level.
- Parathyroid gland – function, action, regulation of secretion of parathyroid hormone.
- Calcitonin – function, action, CA metabolism and hormone regulating CA metabolism

**UNIT - II**

12 hrs

- Special Senses and Neuro-muscular system: Vision – function of different parts of eye, light reflex, refractive errors, colour blindness, night blindness, accommodation.
- Hearing –function of ear, deafness, vestibular apparatus.
- Taste buds – functions, smell physiology, receptors.
- Nervous system: Functions of nervous system, neuron structure, classification and properties, neuroglia. Nerve fibre, classification, conduction of impulses, factors affecting conduction.
- Synapse - structure, types, properties. Receptors - definition, classification, properties. Reflex action - reflex arc, properties of reflex action. Functions



of medulla, pons, hypothalamus. Cerebral cortex, lobes and functions, sensory cortex, motor cortex.

- Cerebellum - functions. Basal ganglia - functions, EEG, Parkinson's disease. Cerebro Spinal Fluid (CSF) - formation, circulation, properties, composition and functions, sleep, types of sleep.
- Muscle nerve physiology: Classification of muscle, structure of skeletal muscle, sarcomere, contractile proteins. Neuromuscular junction, transmission across neuromuscular junction, excitation contraction coupling. Mechanism of muscle contraction, muscle tone, fatigue. Rigor mortis, isometric and isotonic contraction.
- Autonomic nervous system: Sympathetic and parasympathetic distribution and functions.

### **UNIT - III**

12 hrs

- Excretory system: Excretory organs - Kidney: function, structural and functional unit - nephrons, vasarecta, cortical and juxtamedullary nephrons - comparison, juxtaglomerular apparatus - structure and function. Renal circulation peculiarities. Mechanism of urine formation – ultrafiltration, criteria for filtration, GFR, plasma fraction, determination of GFR. Selective reabsorption - sites of reabsorption, substance reabsorbed, mechanisms of reabsorption. Tubular secretion, properties and composition of normal urine output. Abnormal constituents of urine.
- Counter-current mechanisms: micturition, innervations of bladder, cystourethrogram. Diuretics: water, diuretics, osmotic diuretics, artificial kidney, renal function tests.

### **UNIT - IV**

12 hrs

- Skin - function. Body temperature measurement, physiological variation, regulation of body temperature by physical, chemical and nervous mechanisms.
- Hypothermia and fever. Reproductive system and puberty. Male reproductive system - functions of testis, spermatogenesis, spermiogenesis - stages, factors influencing semen, endocrine functions of testis.
- Androgens - Testosterone - structure and functions.
- Female reproductive system - ovulation, menstrual cycle, physiological changes during pregnancy, pregnancy test. Lactation: Composition of milk factors controlling lactation. Contraception

**PRACTICALS:  
BSHHSC186**

**Total - 36 hours  
3 hrs/week**

- Bleeding time
- Clotting time
- Total leucocyte count,
- RBC count
- Differential WBC count
- Instruments used in haematology

**Course Outcomes**

- Students will gain knowledge on instruments used in haematology, RBC count, differential WBC count and blood clotting.

**REFERENCES**

1. Guyton AC, Hall JE (1996) Textbook of Medical Physiology, 9th Ed., Prism Books Pvt Ltd., Bangalore Chatterjee CC (1988) Human Physiology, Calcutta, WB.
2. Wilson (1989) Anatomy and Physiology in Health and Illness, Edinburgh Churchill Livingstone Sembulingam K, Sembulingam P (2012) Essentials of medical physiology, Jaypee Publ.

**II SEMESTER  
ELECTIVE  
RESEARCH METHODOLOGY**

**BSHHSE187**

**Total – 24 hours**

**2 hrs/week**

**Specific objectives:**

To enable Students

- To understand the fundamental principles and techniques of research methodology.
- Develop skills In documentation

**UNIT – I**

**12 hrs**

- Research Methodology: Different techniques and tool of data collection
- Research: Meaning, Objectives, phases of research, measurement of research, different designs, sampling, Analysis of data and interpretation.

**UNIT – II**

**12 hrs**

- Need and Methods of Sampling
- Data Presentation: Diagrammatic and Graphic Representation, Types of Diagrams and Report Writing
- Need for Documentation in Development Project.

**Course Outcomes**

- Students will gain knowledge on fundamental principles and techniques of research methodology and its importance.
- They can inculcate skills in documentation

**REFERENCE**

1. Kothari, C. R., 2004, Research Methodology- Methods and Techniques, New Age International Pvt Ltd. Publishers, Bangalore.
2. Sumati Mulay., 2000, Research Methods in Extension Education – Archan Publications.
3. Best, J. W. and Khan, J. V., 1986, Research and Education – Hall Of India Pvt Ltd.

**II SEMESTER  
ELECTIVE  
CHILD DEVELOPMENT**

**BSHHSE188**

**Total – 24 hours  
2 hrs/week**

**Specific objectives:**

- To understand the child psychology
- To understand the importance of child development

**UNIT – I**

**12 hrs**

- Child Psychology –Importance, Development of Individual, Factors influencing growth and development of an infant.
- Child Development – Meaning and Importance, Characteristics of various stages, Expected development tasks of childhood, Need and Scope for studying child development.
- Factors influencing child development – Nutrition, Age, Sex, Psychological factors.

**UNIT – II**

**12 hrs**

- Aspects of Development – Physical, Motor, Emotional, Social, Language, Cognitive, Moral, Aesthetic.
- Children’s ailments – Crying, Constipation, Diarrhea, Convulsion, Vomiting, Fever, Thrush, Nappy Rash, Colic, Flatulence, Skin Eruptions.
- Child rearing practices – Influence on the Development of a Child.

**Course Outcomes**

- Students can understand the pattern of child development.
- It enhances the knowledge on importance of immunization and its schedule.
- They gain information regarding children’s First aid and child rearing practices

**REFERENCES:**

1. Berk, Laura E. (2017), Child Development, Pearson India Education Services.
2. PremalataMullick (2011), Text Book of Home Science, New Delhi, Kalyani Publishers.
3. Saraswathi T.S and Kaur B. (1993) Human Development and Family studies in India, New Delhi, Sage Publications.

4. Harries, A.C. (1986): Child Development, St. Paul West Publications Unit-I.
5. Learner and Jultsch (1983): Human Development: A Life Span Perspective, Newyork, McGraw Hill Book Co.
6. Gorden I.J., (1975): Human Development, Newyork: Harper and Row Unit-I.

**III SEMESTER  
APPAREL DESIGNING  
THEORY**

**BSHHSC231**

**Total – 48 hours**

**4 hrs/week**

**Specific objectives:**

- To enable the students to develop skills in apparel designing and constructing garments
- To gain knowledge in fundamentals of fashion and garment construction technique

**UNIT - I**

**12 hrs**

- Fashion Interpretation - Terminology Concepts, Characteristics And Fashion Cycle Influence, Dictionary of Fashion Cycle Influence, Dictionary of Fashion Terms and Role of Fashion Designer
- Clothing in Relation to Season, Occasion, Size and Figure, Figure Problem and Optical illusion.

**UNIT – II**

**12hrs**

- Good Grooming and Psychological Aspects of Clothing – Clothing and Wearers, Personality Factors and Clothing Choices, Selection of Fabrics, Factors Effecting Choice of Clothing
- Elements of Design- Line, Colour, Texture.
- Principles of Design in Clothing- Balance, Rhythm, Proportion, Emphasis, Harmony.

**UNIT – III**

**12hrs**

- Traditional Indian Textiles and Embroideries – Dacca Muslin, Baluchar Buttedar, Himrusand Amrus, Kalamdar, Patola, Bhandhnius, Punjabi Phulkari, Kanthasof Bengal, Embroidery of Kashmir, Chikankari and Kasuthi of Karnataka.

**UNIT – IV**

**12 hrs.**

- Importance of Taking Body Measurements – Methods of Taking Measurements, Steps in Preparing Fabrics for Construction
- Pattern Making- Principles and Techniques Involved in Pattern Making

**PRACTICALS:  
BSHHSC234**

**Total - 36 hours  
3 hrs/week**

- Taking Body measurements
- Steps in pattern making
- Darning, patch work and garment enrichment
- Drafting, Tracing and construction of 'A' line Frock for a preschooler/ saree petticoat/Apron
- Computer Aided Design – Visit to study software operation of various machines write the report
- Make a study of collections of famous designers and their famous innovations

**Course Outcomes**

- Students can work in apparel industry or they can start their own fashion boutique
- Students gain knowledge on Computer Aided Designs.

**REFERENCES:**

1. Mungal, R. S., 2015, Textiles Fibre to Fabric, Satyam Publishers & Distributors, Jaipur.
2. Premalata Mullick., 2011, Text Book of Home Science, New Delhi, Kalyani Publishers.
3. Navneet Kaur., 2010, "Comdex Fashion Design" Vol II, Dreamtech Press, New Delhi.
4. Durga Deulkar., 2002, "Household Textiles and Laundry Work." Atma Ram & Sons Publishers.
5. Ziffzer, 1974, Clothing Construction practicals – Prasaranga Mysore University.

**III SEMESTER  
COMMUNITY NUTRITION  
THEORY**

**BSHHSC232**

**Total - 48 hours  
4hrs/week**

**Specific objectives:**

To enable the Students:

- To gain knowledge regarding nutritional needs at different stages of growth
- To understand the concept of growth promotion to the community

**UNIT – I**

12 hrs

- Basic Principles of Meal planning, Factors affecting Meal Planning,
- Explanation of the terms: Health, RDA, Adequate intake, Balanced diet, Food guide pyramid.
- Nutrition during Infancy – Advantages of breast milk, bottle feeding and its effect on child health and weaning foods.

**UNIT – II**

12 hrs

- Growth and development, RDA, RFA, Dietary guidelines and Nutrition needs of Pre- school children , school age children and Adolescents
- Nutritional programmes

**UNIT - III**

12 hrs

- Nutrition during Pregnancy and lactation: Signs, common problems and complications during pregnancy. RDA, RFA, dietary guidelines and nutritional needs of pregnant and lactating mother.
- Nutritional programmes for pregnant and lactating mother

**UNIT – IV**

12 hrs

- Geriatric nutrition: Physiological changes, RDA, dietary guidelines and nutritional needs



**PRACTICALS**  
**BSHHSC235**

**Total : 36hrs**  
**3 hrs/week**

- Weaning foods
- Normal Diet for pre School child/ School age child / Adolescent girl  
(Planning must be done - preparation any one)
- Diet for Pregnant/Lactating mother (Preparation any one)

**Course Outcomes**

- Students can work as nutritionists
- They can join as geriatric care takers

**REFERENCES**

1. Antia FP (2005) Clinical Nutrition and Dietetics, Oxford University Press, New Delhi.
2. Mahan LK, Arlin, M.T.(2000) Krause's Food Nutrition and Diet Therapy 11<sup>th</sup> edition, W.B. Saunders Company, London.
3. Robinson, C.H; Lawler, M.R.Chenoweth, W.L; and Garwick, A.E (1986) : Normal and
4. Shubhangini A Joshi (2002) : Nutrition and Dietetics 2<sup>nd</sup> edition, Tata mc Graw-Hill Publishing Company Limited, New Delhi.
5. Srilakshmi B. (2005): Dietetics, 5<sup>th</sup> edition, New Age International(P) limited Publishers, New Delhi
6. Therapeutic Nutrition, 17<sup>th</sup> Ed., Mac Millan Publishing Co
7. Williams's (1989) : Nutrition and diet Therapy.6<sup>th</sup> edition. Times Mirror /Mosby College Publishing St.Louis

**III SEMESTER  
CHEMISTRY - I  
THEORY**

**BSHHSC233**

**Total - 48 hrs  
4 hrs /week**

**Specific objectives:**

This course will enable the students to

- Enrich the knowledge about the basic principles, fundamental concepts and unique mechanistic steps involved in chemical and biochemical reactions.
- Provide an introduction to key concepts of modern analytical methods and to equip the students to handle the modern analytical instruments.
- Expose the students to the rapid development and enormous expansion of every phase of chemistry.

**UNIT I**

12 hrs

- Structure and Bonding - Chemical bonding, types of chemical bonds – ionic, covalent, coordinate. Hybridization – sp, sp<sup>2</sup>, sp<sup>3</sup>, bond length, bond angles, bond energy, van der Waals interactions, Hydrogen bonding – inter and intramolecular and their significance – anomalous properties of water. Solvents - Types of solvents and their characteristics, weak interactions in aqueous solutions, interaction between water and polar solutes, solubility of ionic solids, lattice energy and solvation energy.

**UNIT II**

12hrs

- Methods of analysis - Qualitative analysis and its types, quantitative analysis and its type:-volumetry, gravimetry and instrumental methods of analysis. Errors in quantitative analysis, minimization of errors. Accuracy, precision, significant figures, measurement of accuracy – absolute error, relative error, measurement of precision – standard deviation, variance.
- Viscosity and surface tension - Definition, determination.
- Reaction Kinetic- Order of reactions, first and second order reactions, methods of determining order of a reaction, theories of reaction rates – collision theory and transition state theory.

**UNIT III**

12 hrs

- Acids and bases: Arrhenius, Bronsted Lowry, solvent system and Lewis concept of acids and bases. Hard and soft acids and bases. Ionic product of water, common ion effect and applications, pH scale, buffers, buffer capacity, Henderson's equation, preparation of acidic and basic buffers,

buffers in biological system – blood plasma, RBC and tissue fluids, theory of acid-base indicators, pH titration curves and isoelectric pH of amino acids. Choice of indicators of acid base titrations.

- Binary Liquid mixtures - Liquid-liquid mixtures, ideal liquid mixtures, non ideal liquid mixtures. Azeotropes HCl – water, ethanol-water systems. Principle of fractional distillation, partially miscible liquids – phenol water system. Trimethyl amine – water and nicotine water systems. Lower and upper consolute temperature. Effect of impurity on consolute temperature, steam distillation – principle and applications.

#### **UNIT IV**

12 hrs

- Introduction to Organic Chemistry - Classification, characteristics, IUPAC nomenclature of organic compounds, isomerism. Detection of elements Nitrogen, Sulphur, Phosphorus and Halogens. Electronic effects- inductive, mesomeric and Resonance effects. Hyper conjugation, aromaticity, homolytic and heterolytic bond breaking reactive intermediates, carbo – anions and cations, electrophiles, nucleophiles, free radicals, carbenes with examples. Arenes: Structure of benzene, mechanism of nitration and Friedel-Crafts reaction.

**PRACTICALS**  
**BSHHSC236**

**Total - 36 hrs**  
**3 hrs/week**

- Qualitative analysis of organic compounds
  - Urea
  - Benzamide
  - Aniline
  - Acetophenone
  - O-cresol
  - Nitro benzene
  - Chlorobenzene
  - Benzoic acid
  - Resorcinol benzyl alcohol
  - Benzaldehyde
  
- II. Determination of R<sub>f</sub> value of Amino acid by Paper Chromatography
  - Ascending
  - Circular

**Course Outcomes**

- Students will gain knowledge on qualitative analysis of different organic compounds and can gain information on chemical and bio-chemical reactions.

**REFERENCES**

1. Soni PL (1988) A textbook of Inorganic chemistry, Sulthan Chand & Sons
2. Lee JD (1988) Concise Inorganic Chemistry, Blackwell Science
3. Skoog DA, West DM, Holler JF (1993) Fundamentals of Analytical Chemistry, New York CBS Publ. Gurudeep Raj (2001) A text book of Inorganic chemistry, Goel Publ. house, Meerut
4. Soni PL (2000) A textbook of Organic chemistry, Sulthan Chand & Sons
5. Bahl A and Bahl BS (2000) Advanced organic chemistry, Sulthan Chand & Sons
6. Vogel AI (1994) Textbook of quantitative chemical analysis, ELBS Ed
7. Agarwal OP (1998) Chemistry of natural products, Goel Sulthan Chand & Sons Publ. House, Meerut Madan RL, Tuli GD (2001) Physical Chemistry, Sulthan Chand & Sons
8. Raj Gurudeep (2001) Textbook of advanced Physical chemistry, Goel Publ. House, Meerut
9. Lehninger AL, Nelson DL, Cox MM (1993) Principles of Bio Chemistry, 2nd Ed. CBS Publ. and distributors

**III SEMESTER  
ELECTIVE  
TOURISM ADMINISTRATION**

**BSHHSE237**

**Total - 24hrs  
2hrs /week**

**Specific Objectives:**

To Enable the Students

- To gain knowledge on Tourism
- To have an Idea of Tourism Legislation

**UNIT I**

12 hrs

- Introduction and Legislation: Meaning, Significance and History, Types Needs for Tourism Organization, Laws Relating to Tourism Legislation.

**UNIT II**

12 hrs

- Travel Agent and Tourism Marketing
- Travel Agent Formalities and Regulations for Tourism
- Customer Service and Skills Tourism Marketing – Tourism Market
- Segmentation, Guidelines for Tourist

**Course Outcomes**

- Students can join tourism industry
- They can guide the tourist regarding regulations

**REFERENCE:**

1. Marketing For Hospitality and Tourism- James C Makenes John T Boneen and Philip Kother 1996.
2. Tourism Operations and Management ArchanaBiwal, S Roday And Vandana Joshi 2009.
3. The Tourist Gaze 3.0 Book by John Urry and guide Jonas Larisem 2011.

**III SEMESTER  
ELECTIVE  
NUTRITION AND DIETETICS**

**BSHHSE238**

**Total - 24hrs  
2hrs /week**

**Specific objectives:**

- To enrich the knowledge of nutrition and dietetics
- To enable the students to identify the food adulterants

**UNIT – I**

12 hrs

- Introduction to Nutrition and Dietetics.
- Effects of cooking on different nutrients – Carbohydrates, Proteins, Fats, Mineral Substance, Vitamin.
- Food preservation – types of preservatives, methods of food preservation.
- Food adulteration – definition, commonly used adulterants in food groups and their detection methods.

**UNIT – II**

12 hrs

- Meal Planning – Advantages, Meal Services and management.
- Factors Affecting Meal Planning.
- Characteristics of Balanced Diet.
- Nutritional care – Adaptation of Normal and Therapeutic Diets.

**Course Outcomes**

- Students can work on balanced diet
- They can work in industry to detect adulterants

**REFERENCES:**

1. Srilakshmi (2014), Dietetics, New Age International Publications, New Delhi.
2. PremalMullick (2011), Text Book of Home Science, New Delhi, Kalyani Publishers.
3. Joshi S.A (1992), “Nutritional & Dietetics”, Tata McGraw Hill Publications, New Delhi.
4. M. Raheena Begum (1986) “Text Book of Food Nutrition and Dietetics” Sterling Publication Pvt. Ltd.
5. Swaminathan M.S. (1985) “Essentials of Food & Nutrition Fundamental Aspects” VII Applied aspects.
6. Krause M.V, Mohan L.K. “Food Nutrition and Diet Therapy”.

**IV SEMESTER  
LIFE SPAN DEVELOPMENT: THE EARLY CHILDHOOD  
THEORY**

**BSHHSC281**

**Total - 48 hrs  
4 hrs/week**

**Specific objectives:**

To enable the students to understand

- The importance of early childhood education for future learning
- To learn how to organize and manage of a good nursery school

**UNIT – I** 12hrs.

- Introduction – Definition, need and scope of Human Development, trends and Issues in Human Development, concepts and principles of growth and development. Theoretical perspectives and methods of studying Human Development. Influence of Heredity and Environment on development (theoretical perspective).

**UNIT – II** 12 hrs.

- Prenatal Development - conception, pregnancy, signs, symptoms, discomforts, complications, stages of prenatal development, factors affecting prenatal development.
- Child birth, - Process and types of birth, birth complications.

**UNIT – III** 12 hrs

- The Neonate : appearance, Size Proportion and Care, Physiological functioning and behavior patterns
- Infancy (From one month to 2 years): Physical Development and Motor skills, emotional Development, cognitive development and social development.
- Habit and Habit formation

**UNIT – IV** 12 hrs

- Pre-school Child (2-6 years): Physical growth and motor skills social behavior, Intellectual Development, Pre-school Childs vocabulary, discipline and guidance of pre-school child.
- Nursery School – Essentials of a nursery school, Building, Equipment and personnel, programme in the Nursery school, values of play, parent education, Types of pre schools – Creches, Anganawadies, day care centres, Balwadies.
- Methods of child study.

**PRACTICALS**  
**BSHHSC284**

**Total – 36 hrs**  
**3 hrs/week**

- Observation of different developments among children
  - Physical development
  - Motor development
  - Emotional Development
  - Language Development
  - Intellectual Development
- Rhyme
- Story telling
- Basic Activities
- Review of Literature
- Write a report on cultural practices related to pregnancy and early childhood.
- Visit to nursery schools/ anganwadies.

**Course Outcomes**

- Students can work as child development project officer and supervisor they can work in day care centers as teachers, counselor and own a nursery school, and they can become a good care taker, provide consultancy services.
- It provides wage employment opportunities such as supervisor/ teacher at crèche, play school, day care centre etc... and self employment opportunities such as owner of crèche, play school, day care centre etc

**REFERENCE:**

1. Life span development – a topical approach, third edition, Jhon W. Santrock, Tata McGraw-Hill edition.
2. Human development, eleventh edition, Diane Papalia, Sally Olds, Ruth Field Man, MaGraw Hill.
3. Human development, Ninth edition, Diane Papalia, Sally Olds, Ruth Field Man, Ma Graw Hill.
4. Developmental Psychology, a lifespan approach, Elizabeth Hurlock, McGraw Hill,
5. Understanding Human development, third edition, Weddy L. Dunn, Grace JeroigMcGraw Hill.
6. Nayak A.K. (2007) Guidance and counseling, APH publishing corporation.



**IV SEMESTER  
NUTRITION MANAGEMENT IN HEALTH AND DISEASES  
THEORY**

**BSHHSC282**

**Total -48hrs  
4 hrs/week**

**Specific Objectives:**

- To gain knowledge about dietary Management in health and common diseases.
- To help students to use the principles and integrate with disease conditions.

**UNIT – I**

12 hrs.

- Basic concepts of Diet Therapy- Principles of Diet Therapy, modification of normal diet to suit therapeutic needs – Routine hospital diets – clear fluid, full fluid and soft diets.

**UNIT – II**

12 hrs

- Nutrition for Weight Management
- Underweight -Etiology, complications Dietary management.
- Over Weight and obesity – Assessment, types, complications of obesity and Dietary Management.

**UNIT- III**

12 hrs

- Nutrition during Febrile conditions: Classification of fever, Metabolic changes in fever and general dietary considerations.
- Dietary Management during Typhoid, Tuberculosis and Malaria.

**UNIT – IV**

- Nutrition in Diabetes mellitus: Prevalence, Classification, Factors influencing, Risk factors, metabolic changes and dietary management.

**PRACTICALS**  
**BSHHSC285**

**Total – 36 hrs**  
**3 hrs/week**

Planning and Preparation of the following,

- Fluid Diets
- Diet for underweight and obese patients
- Diet for febrile. condition fever/typhoid/malaria
- Diets for Diabetes Mellitus patients

**Course Outcomes**

- Students can become a care taker and a good guide, work as diet planners and counselors in hospitals.
- Students can take up self employment as preparation of food products and they can become nutrition education program assistant along with extension educator in program implementation.

**REFERENCE:**

1. Antia FP (2005) Clinical Nutrition and Dietetics, Oxford University Press, New Delhi.
2. Mahan LK, Arlin, M.T.(2000) Krause's Food Nutrition and Diet Therapy 11<sup>th</sup> edition, W.B. Saunders Company, London.
3. Robinson, C.H; Lawler, M.R.Chenoweth, W.L; and Garwick, A.E (1986) : Normal and
4. Shubhangini A Joshi (2002), Nutrition and Dietetics 2<sup>nd</sup> edition, Tata mc Graw-Hill Publishing Company Limited, New Delhi.
5. Srilakshmi B. (2005): Dietetics, 5<sup>th</sup> edition, New Age International(P) limited Publishers, New Delhi.
6. Therapeutic Nutrition, 17<sup>th</sup> Ed., Mac Millan Publishing Co.
7. Williams's (1989): Nutrition and diet Therapy.6<sup>th</sup> edition. Times Mirror/Mosby College Publishing St.Louis.

**IV SEMESTER  
CHEMISTRY - II  
THEORY**

**BSHHSC283**

**Total - 48 hrs  
4 hrs / week**

**Specific Objectives:**

This course will enable the students to:

- Enrich the knowledge about the basic principles, fundamental concepts and unique mechanistic
- steps involved in chemical and biochemical reactions
- Provide an introduction to key concepts of modern analytical methods and to equip the students to handle the modern analytical instruments
- Expose the students to the rapid development and enormous expansion of every phase of chemistry

**UNIT I**

12 hrs

- Bioinorganic Chemistry - Essential and trace elements in biological systems- chloride, calcium, magnesium, chromium, iodine, fluorine, phosphorus, selenium, molybdenum, copper, iron, sulphur, Nitrogen( daily dietary requirement, function and effects). functions of Sodium, Potassium, Calcium, Magnesium- sodium pump calcium pump. Toxicity of lead, mercury, cadmium and arsenic. Metal ions in Biological systems: Examples of naturally occurring complex compounds in living systems. Role of Iron in Hemoglobin, myoglobin and cytochromes, copper in hemocyanin, magnesium in chlorophyll, cobalt in Vitamin B12, molybdenum in nitrogenase, metalloenzymes – example and importance

**UNIT II**

3 hrs

- Adsorption: Types, Freundlich adsorption isotherm, Langmuir's adsorption isotherm applications of adsorption, adsorption indicators in precipitation titrations.

3 hrs

- Colloidal State: Solids in liquids (sols), properties, kinetic optical and electrical, stability of colloids, protective action, Hardy Schulze law, Gold number, Liquids in liquids (emulsions), Types of emulsions, preparation, emulsifiers. Liquids in solids (gels). Classification, preparation and properties, Inhibition of gels – general applications of colloids.

6hrs

- Radio chemistry: Nuclear stability, n/p ratio, Natural radioactivity, characteristics of radioactive elements, radioactive decay series, artificial transmutation using protons, neutrons, deuterons, induced radio activity, disintegration constant, half life. Radiation dosimetry. Fricke and Ceric sulphate dosimeter. Application of radio isotopes in medicine,

agriculture and study of reaction mechanism and  $^{14}\text{C}$  dating. Biological effects of radiation, safety measurements in handling radio isotopes

### UNIT III

6 hrs

- Photochemistry: Laws of photochemistry – Grothus and Draper law, Einstein's law of photochemical equivalence, quantum efficiency, high and low quantum efficiency, photosensitization, photoinhibition, fluorescence, phosphorescence, chemiluminescence, bioluminescence with examples, photosynthesis.

6 hrs

- Techniques: Lambert's law, Beer's law, Beer-Lambert's law, molar absorption, molar extinction coefficient, transmittance and absorbance, their relationship, colorimeter, UV-Vis spectroscopy - instrumentation, working, applications. Flame photometry – instrumentation, working, applications

### UNIT IV

12 hours

- Carbon and its compounds- Definition for- allotropy, tetravalency, Catenation
- Alkanes: preparation, and chemical reactions
- Alkenes: Preparation of alkenes: Chemical reactions of alkenes: oxidation, ozonolysis, hydration, hydroxylation, polymerization, addition of HBr to propene, Markownikoff's rule. ( mechanisms not required)
- Dienes: Classification, types with examples, butadiene, methods of preparation. Chemical reactions, mechanism of addition of  $\text{Br}_2$  and HBr. Polymerization, Diels alder reaction ( mechanisms not required)
- Alkynes: Acidity of alkynes, ozonolysis, polymerization. Alkyl halides:  $\text{SN}_1$  and  $\text{SN}_2$  reactions. Mechanism with one example for each. Concept of elimination reactions.  $\text{E}_1$  and  $\text{E}_2$  mechanisms.

**PRACTICALS**  
**BSHHSC286**

**Total - 36 hrs**  
**3 hrs/week**

Volumetric analysis

- Use of analytical balance and calibration of pipette
- Preparation of standard Sodium carbonate solution and standardization of HCl and estimation of NaOH.
- Preparation of standard potassium biphthalate solution. Standardization of NaOH and estimation of HCl in the given solution (Phenolphthalein)
- Preparation of standard Oxalic acid solution. Standardization of  $\text{KMnO}_4$  and estimation of Mohr's salt in the given solution
- Preparation of  $\text{K}_2\text{Cr}_2\text{O}_7$ . Standardization of  $\text{Na}_2\text{S}_2\text{C}_3$  and estimation of  $\text{CuSO}_4$  in the given solution (starch)
- Preparation of  $\text{ZnSO}_4$ . Standardization of EDTA and estimation of total hardness of water using Eriochrome black T indicator
- Preparation of  $\text{K}_2\text{Cr}_2\text{O}_7$  solution. Estimation of Ferrous/Ferric ions in a mixture using diphenylamine indicator
- Estimation of alkali content in antacid tablet by using HCl
- Estimation of Vitamin C
- Estimation of Glucose
- Estimation of amino acid

**Course Outcomes**

- Students can enrich their knowledge about the basic principles, fundamental concepts and unique mechanistic and steps involved in chemical and biochemical reactions
- They also learn the key concepts of modern analytical methods and to equip the students to handle the modern analytical instruments
- students will be exposed to the rapid development and enormous expansion of every phase of chemistry

**REFERENCES**

1. Soni PL (1988) A textbook of Inorganic chemistry, Sulthan Chand & Sons
2. Lee JD (1988) Concise Inorganic Chemistry, Blackwell Science
3. Skoog DA, West DM, Holler JF (1993) Fundamentals of Analytical Chemistry, New York CBS Publ.
4. Gurudeep Raj (2001) A text book of Inorganic chemistry, Goel Publ. house, Meerut
5. Soni PL (2000) A textbook of Organic chemistry, Sulthan Chand & Sons
6. Bahl A, Bahl BS (2000) Advanced organic chemistry, Sulthan Chand & Sons

7. Vogel AI (1994) Textbook of quantitative chemical analysis, ELBS Ed.
8. Agarwal OP (1998) Chemistry of natural products, Goel Sulthan Chand & Sons Publ. House, Meerut
9. Madan RL, Tuli GD (2001) Physical Chemistry, Sulthan Chand & Sons
10. Raj Gurudeep (2001) Textbook of advanced Physical chemistry, Goel Publ. House, Meerut
11. Lehninger AL, Nelson DL, Cox MM (1993) Principles of Bio Chemistry, 2nd Ed. CBS Publ., and distributors

**IV SEMESTER  
ELECTIVE  
FOOD AND NUTRITION**

**BSHHSE287**

**Total – 24 hrs  
2 hrs/week**

**Specific Objectives:**

- To help the students to understand different Nutrients
- To plan a meal with Therapeutic needs

**UNIT – I**

12 hrs.

- Introduction to Food and Nutrition.
- Importance of Different Nutrients: Carbohydrates, Proteins, Fats, Minerals and Vitamins.
- Food Preservation Importance and Methods.

**UNIT – II**

12 hrs

- Meal Planning - Importance and Factors affecting meal planning.
- Characteristics of Balanced Diet
- Planning Normal Diets

**Course Outcomes**

- Students can plan the diets with the knowledge of different nutrients
- They will gain knowledge food preservation methods and techniques

**REFERENCES**

1. Srilakshmi (2014), Dietetica, New Age International Publishers, New Delhi.
2. Premalata Mulick (2011), Text Book of Home Science, New Delhi, Kalyani Publishers.
3. Joshi S A (1992), "Nutrition & Dietetics," Tata MecGraw Hill Publication New Delhi.
4. M Raheena Begum (1986) "Text Book of Food Nutrition and Dietetics" Sterling Publication Pvt Ltd.
5. Swaminathan M S (1985) "Essentials of Food & Nutrition Fundamental Aspects" VII Applied Aspects.
6. Krause M V Mohan L K ' Food Nutrition And Diet Therapy'

**IV SEMESTER  
ELECTIVE  
RESOURCE MANAGEMENT AND INTERIORS**

**BSHHSE288**

**Total – 24 hrs  
2 hrs/week**

**Specific Objectives:**

- To help the students to learn in managing resources wisely
- To enhance the esthetic qualities of an individual.

**UNIT – I**

12 hrs.

- Resource Management – Definition, Science and Art, Characteristics of Resources, Qualities of Resource Manager.
- Process of Resource Management.
- Motivating factors of Management – Values, Standards and Goals.

**UNIT – II**

12 hrs.

- Interior Decoration – Introduction.
- Colour in the home.
- Arranging Flowers – styles and conditioning of flowers.

**Course Outcomes**

- Students can work as interior designers
- They can work as florists or can start flower decorations as self employment

**REFERENCES:**

1. Premalatha Mullik (2011) “Text Book of Home Science” Kalyani Publishers, New Delhi.
2. Seetharam Premavathi, Pannu, Parveen (2005) Interior Decoration CBS, Publishers & Distributors, Bangalore.
3. Pratap Rao (2005) “Interior Design, Principles and Practice” Standard Publishers & Distributors, Delhi.
4. Bela Bharghava (2005) “Family Resource Management and Interior Decoration”, University Book House (P) Ltd.
5. Nickel P. and Dorsey J.M. (1986) “Management in Family Living”, 3<sup>rd</sup> edition John Wiley and Sons, Newyork.
6. Varghese, Ogale and Srinivasan (1985) “Home Management” New Age International Limited, New Delhi.
7. Gross and Crandall and Kroll (1980) “Management in Modern Families” Prentice Hall, New Jersey.
8. Anna Hong Rutt (1961) “Home Furnishing” John Wiley Eastern Pvt. Ltd., New Commerce.



**V SEMESTER  
LIFE SPAN DEVELOPMENT - SCHOOLAGE TO ADULTHOOD  
THEORY**

**BSHHSC331**

**Total - 36 hours  
3 hrs/week**

**Specific Objectives:**

- To understand different developmental tasks in each stage of life.
- To understand the role of parents and peers in development.

**UNIT-I**

**9 hours**

- Developmental tasks, Physical, Social, Emotional, Moral and Intellectual Development,
- Common health problems during school age – sore throat, colds and coughs, Flue, Breathing problems, Stomach ache, Dental carries/oral, ocular health, Bed wetting, Diarrhea, Malaria.
- Role of Immunization

**UNIT – II**

**9 hours**

- Adolescence – Definition, Developmental tasks, physical changes, puberty, growth spurt, primary and secondary sex characteristics, role of confusion, Ego identity.
- Problems of adolescents

**UNIT-III**

**9 hours**

- Developmental tasks, Physiological changes, health status and health care, cognitive and emotional changes, effect of retirement on self and family, personality characteristics of oldage.

**UNIT-IV**

**9 hours**

- Family counseling – concept, nature, scope, principles and need of family counseling, thrust areas in family counseling-educational, vocational, social personal, pre-marital and marital problems, methods and approaches to family counseling.

**PRACTICALS**  
**BSHHSC337**

**Total -36 hrs**  
**3 hrs/week**

- Participation in preschool with visual aids.
  - Nature experience.
  - Science experience
  - Dramatization.
- Creative Activities.
- Case study of an adolescent-including study of self, family relationship and peer relationship.

**Course Outcomes**

- Students can provide consultancy services, become marriage and family counselors and they are prepared to manage day to day family affairs which help them to lead a healthier and purposeful life
- It provides wage employment opportunities such as supervisor/ teacher at crèche, play school, day care centre etc. and self employment opportunities such as owner of crèche, play school, day care centre etc.

**REFERENCE:**

1. Life span development – a topical approach, third edition, Jhon W. Santrock, Tata McGraw-Hill edition.
2. Human development, eleventh edition, Diane Papalia, Sally Olds, Ruth Field Man, MaGraw Hill.
3. Human development, Ninth edition, Diane Papalia, Sally Olds, Ruth Field Man, McGraw Hill.
4. Developmental Psychology, a lifespan approach, Elizabeth Hurlock, McGraw Hill,
5. Understanding Human development, third edition, Weddy L. Dunn, Grace JeroigMcGraw Hill.
6. Nayak A.K. (2007) Guidance and counseling, APH publishing corporation.

**V SEMESTER**  
**INTERIOR DECORATION AND ETIQUETTE**  
**THEORY**

**BSHHSC332**

**Total – 36 hours**  
**3 hours/week**

**Specific Objectives:**

- To provide an insight into the foundation of art and design.
- To learn different styles of flower arrangements and their suitability in different rooms.
- To acquaint the students with the basic knowledge in the art of entertainment and etiquette.

**UNIT-I**

**9 hours**

- Interior decoration – Objectives
- Types of design – Structural and Decorative Types of Motifs Used in Decorative Design- Naturalistic, Stylized, Geometric and Abstract.
- Elements of art- Line, Form, Colour, Texture, Pattern, Light and Space.
- Principles of design-Balance, Proportion, Rhythm, Harmony and Emphasis- Their Application in Interiors

**UNIT-II**

**9 hours**

- Colour at home-qualities of colour-Hue, Value and Intensity.
- Value scale-Tints, Shades, Neutrals.
- Colour systems; Prang colour system
- Standard colour combinations: Monochromatic, analogous, complementary, double complementary, split complementary, triad, tetrad.

**UNIT-III**

**9 hours**

- Flower arrangement: Materials used, Styles, Preparation and care of flowers
- Landscape gardening: Importance and principles of landscape and outdoor plant varieties.

**UNIT – IV**

**9 hours**

- Etiquette-meaning and introduction, Planning and organizing parties, Table setting, Table ware, Introduction of guests and art of conversation, Table manners and Role of hostess

**PRACTICALS**  
**BSHHSC338**

**Total – 36 hours**  
**3 hrs/week**

- Illustrating and explaining structural and decorative design, elements of art and principles of design.
- Painting colour wheel, value scale, neutrals, tints and shades, standard colour schemes.
- Flower arrangements-styles and arrangements suited to different areas.
- Making invitations-acceptance and rejection letters, note paper, place card, greeting card, thank you card, get well card and book mark.
- Table setting – formal and informal, napkin folding.

**Course Outcomes**

- Students can work along with interior designers, flower decorators as assistants and also become good home decorator and also become good home decorator by making different styles of flower arrangements. Students can take up flower arrangement, planning and organizing events like birthday party, naming ceremony etc...as self- employment.

**REFERENCES**

1. Anna Hong Rutt (1961), Home Furnishing, John Wiley Eastern Pvt. Ltd., New Commerce.
2. Goldstein and Goldstein; 'Art in everyday life' the Macmillan co.
3. Dorothy Sara; 'The collier quick and easy guide to etiquette', New York collier books.
4. Sarah, Faulkner (1979); Planning a House Rinehart and Winsten.
5. PratapRao (2005) Interior Design, Principles & Practice Standard publishers and distributors, Delhi.
6. SeetharamPremvathi, Pannu, Parveen(2005), Interior Design & Decoration CBS, Publishers &Distributors, Bangalore.

**V SEMESTER  
FOOD PRESERVATION – I  
THEORY**

**BSHHSC333**

**Total - 36 hrs  
3 hrs/week**

**Specific Objectives**

This course will enable students to:

- Understand the basic concepts and parameters of preservation techniques
- Know the types and variety of foods available in the markets
- Learn to purchase and preserved different foods
- Learn various quality and preservation techniques used in various foods

**UNIT I**

**9 hrs**

Definition, Importance of food preservation. Causes of food spoilage - microorganisms, enzymes, insects, parasites and rodents, environmental factors and measures to control them. Classification of food by ease of spoilage. General principles of food preservation. Methods of food preservation - asepsis (keeping out of microorganisms), maintenance of aseptic condition, removal of microorganisms - clarification, filtration, centrifugation, thermal processing (blanching, pasteurization, sterilization and microbial death time), food drying and dehydration, cooling and freezing, food preservation using chemicals, irradiation and other emerging techniques Classification of food for processing.

**UNIT II**

**9 hrs**

Concept of food concentration. Sugar concentrates -general principles. Methods of preparation of jam, jellies and marmalade, tests of doneness, problems in jam and jelly preparation. Theory of gel formation. Factors affecting gel formation. Definition, preservation and preparation of crystallized and glazed fruits, squashes and syrups. Types of syrups. Temperature test for syrups and candies. Salt concentrates - general principles. Role of ingredients in preparation of pickles. Types of pickles. Definitions and preparation of sauerkraut, dill and common Indian pickles

**UNIT III**

**9 hrs**

Irradiation: Definition, principles, Sources of radiation, mechanism of irradiation, Units of irradiation, mode of action. Use of radio isotopes in irradiation, Effects on foods and nutrients, Advantages and disadvantages. Uses, Effect of food irradiation on food quality.

**UNIT IV**

**9 hrs**

Drying: Definition, General Principle, Methods and Types of driers. Factors controlling drying and dehydration. Dehydration: Definition, principles, pre-treatments for drying, changes during drying, effects of drying on nutritive value, Factors influencing dehydration, Sun drying vs. artificial drying

**PRACTICAL  
BSHHSC339**

**Total - 36 hours  
3 hrs/week**

1. Preservation of food using different methods (Blanching, Dehydration, Freezing)
2. Preparation of pickles (on basis of expected shelf life) Short and long shelf life. Pickles, sweet pickles, spicy and sour pickles with or without oil.
3. Preparation of jam, jelly, morabbas, marmalade, fruit candies, candied peels, guava cheese, toffees.
4. Visit to food industry

**Course Outcomes**

- They can join in the food industry
- Students can work in food packaging fields

**REFERENCES**

- Frazier WC, Westoff DC (1998) Food Microbiology 4th Ed., Tata Mc Graw Hill Publ. Co. Ltd
- Prescott SC, Proctor BE (1937) Food Technology, McGraw Hill
- Desroier NV (1963) The technology of food preservation, AVI Pub. Co
- Lal G, Siddappa GS, Tandon GL (1960) Preservation of food and vegetables, ICAR, New Delhi
- Manay NS, Shadaksharaswamy M (2010) Foods - Facts and principles, New Age International Publ., New Delhi

**V SEMESTER  
EXTENSION EDUCATION  
THEORY**

**BSHHSC334**

**Total – 36 hrs  
3 hrs/week**

**Specific Objectives:**

- To understand the concept of Extension Education.
- To develop a sense of readiness to be the part of community.

**UNIT-I**

**9 hours**

- Extension Education – Definition, Meaning, objectives, principles, scope, qualities of an extension facilitator.
- Home Science Extension – concept, definition, objectives– its contribution towards development of community.

**UNIT-II**

**9 hours**

- Extension Teaching and Learning:- Extension teaching – concept, goals, characteristics, steps, phases in extension education process. Edigar Dav’s cone of experience, Adult learning, factors affecting, types, teaching process – types of teaching methods, principles of teaching, qualities of a good teacher.
- Leader and Leadership – types, styles, qualities, functions, advantages and disadvantages of working with leaders, training campus.

**UNIT-III**

**9 hours**

- Visual Media and Communication literature
- A detailed study of Some of the visual aids – poster – photographs, slides,, blackboard, Bulletin board, flash cards, flannel graphs, exhibits, charts.
- Communication Literature – Leaflets and folders, circular letters, tours report, group discussions, lectures, symposium and proceedings.

**9 hours**

**UNIT – IV**

- Traditional Media – Folk Media, puppet show, Folk Drama, folk songs- Folk dance
- Recent trends in Communication – ICR Tools, print and electronic media, e-mail, internet, uses of Multimedia, Mobile Phone, Video and teleconferencing, Computer assisted instructions, Web technology and information kiosks

**PRACTICALS**  
**BSHHSC340**

**Total - 36 hours**  
**3 hrs/week**

- Select and prepare community development message using different methods and media.
  - Plan for the community.
  - Develop message to the community
  - Evaluate the Teaching aid used.
- Interview or case study about a leader or successful social worker or organization itself which is useful for community development.

**Course Outcomes**

- This course enhances the knowledge on extension education and community development for the students and develop a plan of work for an extension education programme and prepare them for appropriate careers in the field.

**REFERENCES:**

1. P.M. Khan and L.L. Somani (2010): Fundamentals of Extension Education, Agrotech publishing company.
2. Wittch and Schuller (2002) : Audio Visual Materials, Havper& Row publications.
3. Extension Education by S.K. Waghmare (2007) New Age India publications.
4. Fundamentals of Teaching Home Science by Arvind Chandra, Anupam Shah and Uma Joshi (2010) International publishers.
5. A textbook of Audio-Visual aids by Lalit Kishore (2002) United publications.
6. Education and Communication for Development by O.P. Dahama and O.P. Bhatnagar (2007) revised edition, New Age India publications.
7. Singh, R, (2002): Text book of Extension Education, Sahitya Kala Prakashan, Ludhiana.



**V SEMESTER  
CHEMISTRY - III  
THEORY**

**BSHHSC335**

**Total - 36 hrs  
3 hrs/ week**

**Specific Objectives**

This course will enable the students to

- Enrich the knowledge about the basic principles, fundamental concepts and unique mechanistic steps involved in chemical and biochemical reactions
- Provide an introduction to key concepts of modern analytical methods and to equip the students to handle the modern analytical instruments
- Expose the students to the rapid development and enormous expansion of every phase of chemistry

**UNIT I**

9 hrs

- Co-ordination Compounds: Transition metals, properties (colour, oxidation states, magnetic properties, catalytic properties,). Double and complex salts - differences with examples. Postulates of Werner's theory . Ligands and its types of ligands - uni, bi, poly-dentate, ambidentate with examples, coordination number, stability of complexes, factors influencing stability of complexes, Valence bond theory, structure and magnetic properties of some complexes. Applications of complex formation, metal complexes as therapeutic agents - Platinum, gold, copper complexes.

**UNIT II**

9 hrs

- Dilute solutions: Dilute solutions and colligative properties. Ideal and non-ideal solutions, methods of expressing concentrations of solutions. Colligative properties, osmotic pressure and its measurement by Berkley and Hartley's method. Laws of osmotic pressure. Importance of osmotic pressure on living cells - hypotonic, hypertonic, isotonic solutions. Donnan membrane equilibrium, Raoult's law, relative lowering of vapour pressure. Molecular weight determination from osmotic pressure and relative lowering of vapour pressure. Elevation of boiling point, depression in freezing point, experimental methods for determining various colligative properties. Vant Hoff's factor. Abnormal molecular weight. ( no need to workout problems )

**UNIT III**

9 hrs

- Alcohols: Classification, monohydric alcohols – general reactions, distinguishing reaction for 1,2 and 3 alcohols. Dihydric alcohols – Glycol preparation reactions and uses. Trihydric alcohols: Glycerol, synthesis, reactions, uses. Phenols: Acidity of phenols, effects of substituents on acidity on phenols. Reactivity of phenols towards electrophiles, uses. Carbonyl compounds: Synthesis of aldehydes and ketones. Structure, reactivity and properties of carbonyl group, nucleophilic addition reactions, aldol condensation, Perkins reaction, Cannizzaro reaction (mechanism).

**UNIT IV**

9 hrs

- Carboxylic acids: Synthesis of monocarboxylic acids, acidity of carboxylic acids, effect of substituents on acidity of carboxylic acids
- Hydroxy acids and dicarboxylic acids: Structure, preparation and properties of lactic acid, tartaric acid, citric acid, Succinic acid, maleic acid, fumaric acid. Effects of heat and dehydrating agents on hydroxy acids.
- Amines: Classification, properties, synthesis of aliphatic and aromatic amines, separation of primary, secondary and tertiary amines ( Hinsberg method). Distinguishing reactions of primary, secondary and tertiary amines.

**PRACTICALS**  
**BSHHSC341**

**Total - 36 hrs**  
**3 hrs/week**

Organic reparations

1. Acetanilide from aniline
2. M-dinitro benzene
3. Parabromo acetanilide
4. Benzoic acid from toluene

Physical chemistry experiments

5. Determination of density of a liquid using specific gravity bottle
6. Viscosity using Ostwald's method
7. Molecular weight of non-volatile substance by Walker Lumsden method
8. Critical solution temperature of phenol water system
9. Percentage of given electrolyte (NaCl) in water – phenol system by miscibility temperature method
11. Rate constant of decomposition of H<sub>2</sub>O<sub>2</sub> using KmNO<sub>4</sub>
12. Density of a liquid using specific gravity bottle and surface tension

**Course Outcomes**

- This course acknowledge the students with key concepts of modern analytical methods and help to handle the modern analytical instruments
- Students will be exposed to the rapid development and enormous expansion of every phase of chemistry

**REFERENCES**

1. Soni PL (1988) A textbook of Inorganic chemistry, Sulthan Chand & Sons
2. Lee JD (1988) Concise Inorganic Chemistry, Blackwell Science
3. Skoog DA, West DM, Holler JF (1993) Fundamentals of Analytical Chemistry, New York CBS Publ.
4. Gurudeep Raj (2001) A text book of Inorganic chemistry, Goel Publ. house, Meerut
5. Soni PL (2000) A textbook of Organic chemistry, Sulthan Chand & Sons
6. Bahl A and Bahl BS (2000) Advanced organic chemistry, Sulthan Chand & Sons
7. Vogel AI (1994) Textbook of quantitative chemical analysis, ELBS Ed.
8. Agarwal OP (1998) Chemistry of natural products, GoelSulthan Chand & Sons Publ. House, Meerut
9. Madan RL, Tuli GD (2001) Physical Chemistry, Sulthan Chand & Sons
10. Raj Gurudeep (2001) Textbook of advanced Physical chemistry, Goel Publ. House, Meerut

11. Lehninger AL, Nelson DL, Cox MM (1993) Principles of Bio Chemistry, 2nd Ed., CBS Publ., and distributors. 46

**V SEMESTER  
FOOD MICROBIOLOGY – I  
THEORY**

**BSHHSC336**

**Total – 36 hrs.  
3 hrs/week**

**Specific Objectives:**

This course will enable students to:

- To understand the nature of microorganisms involved in Food Spoilage, Food Infections and Intoxications
- To understand the importance of Microorganisms in Food Industry

**UNIT I**

9 hrs

- Definition and history of microbiology - Contributions of Antonie van Leewenhoek, Louis Pasteur, LazarroSpallanzani, Robert Koch, Joseph Lister, Edward Jenner, Alexander Fleming, MW Beijerinck and Dmitri Ivanowsky to the development of microbiology. Culture media used in the isolation and culturing of microorganisms. The common nutrient requirement for bacteria - macro and micronutrients, Saprophytic Nutrition, Holozoic Nutrition.

**UNIT II**

9 hrs

- Instrumentation in microbiology - Construction and working principles of autoclave, hot air oven, laminar air flow, incubator, bacterial colony counter.. Sterilization - Physical methods - heat, irradiation, filtration. Chemical methods - alcohol, aldehydes, dyes, halogens, phenols, metallic salts, surface active agents, gases

**UNIT III**

9 hrs

- Bacteria - classification according to Bergey's manual upto levels of section, ultrastructure, reproduction - asexual and sexual methods, importance of bacteria in food.
- Viruses - structure and classification - plant, animal, bacterial and cyanophycean viruses, life cycle in virus - lytic and lysogenic cycle.

**UNIT IV**

9 hrs

- Yeast - morphology, reproduction - haplobiontic, diplobiontic and haplodiplobiontic cycle, physiology and nutrition in yeast. Importance of yeast in food.
- Mold - outlines of classification and reproduction - asexual and sexual modes. Type study of Aspergillus, Fusarium, Penicillium Rhizopus and Mucor. Importance of molds in food.

## **PRACTICALS**

**BSHHSC342**

**Total –36hrs**

**3 hrs/week**

- Introduction –Good laboratory Practices. Study of apparatus used in microbiology lab
- Study of compound microscope.
- Cleaning and sterilisation of glassware.
- Preparation of culture media-Nutrient agar, Potato Dextrose Agar, EMB agar.
- Culturing of micro-organisms –point inoculation, streak inoculation, spread plate method, pour plate method and swab method.
- Simple staining of bacteria. Gram staining of bacteria. Negative staining of bacteria.
- Wet mount of fungi using lactophenol blue stain.
- Study of bacterial motility by hanging drop technique.
- Sampling of soil-Serial dilution technique.
- 10. Sampling of air by Plate exposure method.

### **Course Outcomes**

- Students gain knowledge on the nature of microorganisms involved in Food Spoilage, Food Infections and Intoxications and understand the importance of Microorganisms in Food Industry. With this knowledge they can work in various food industries.

### **REFERENCES**

1. Frazier WC, West off DC (1998), Food Microbiology 4th Ed., Tata McGraw Hill Publ. Co. Ltd.
2. Jay J M (1986) Modern Food microbiology, 3rd Ed., Van No Strand Reinhold Co. Inc.
3. Pelezer ML, Reid RD (1978) Microbiology, McGraw Hill Book Co., New York
4. Brown A, Smith H (2015) Benson's Microbiological applications, McGraw Hill Publ.
5. Willey J, Sandman K, Wood D (2016) Prescott's Microbiology, 11<sup>th</sup> Ed., McGraw Hill Book Co., Newyork.

**VI SEMESTER  
HUMAN DEVELOPMENT AND FAMILY RELATIONS  
THEORY**

**BSHHSC381**

**Total - 3 hours  
3 hrs/week**

**Specific Objectives:**

- To introduce the student to the field of Human development, concepts, Scope, Dimensions and Interrelations.
- To study the interventions in the field of human development.

**UNIT - I**

**9 hours**

- Marriage: Concept of marriage in Indian society, types of marriages, Factors to be considered: cultural, religious, economic. Responsibilities and adjustments in marriage.

**UNIT – II**

**9 hours**

- Family: Purpose and functions of family, types of family.
- Beginning family –preparation of parenthood, family with a newborn, family with preschooler, family with adolescents.
- Family at the launching stage – health problems, re organization of the family living.
- Family in the later years –health problems, relationship problems, decreased income leisure time activities.

**UNIT - III**

**9 hours**

- Family crisis- death, old age, infidelity, separation, alcoholism, divorce, adoption.

**UNIT - IV**

**9 hours**

- Family planning- temporary and permanent methods of Family planning

**PRACTICALS**  
**BSHHSC387**

**Total – 36 hrs.**  
**3 hrs/week**

- Project -Case studies on any of the following topics
- Interviewing a single parent (away due to profession / due to care of elderly parents / due to illness of any one member due to death, due to divorce) studying the effect of separation of children / couple
- Case study of grieving individual
- Case study in working middle aged men and women on preparation for retirement
- Health problems of elderly people
- Visit to counseling centre, family court, old age centre/de-addiction centre etc.

**Course Outcomes**

- Students will gain knowledge on how to solve crisis in the family and community. So that they can guide and counsel
- Students can work in projects related to family planning

**REFERENCES:**

1. Gorden, I.J.[1975]: Human Development, New York: Harper an Row, Unit I PP.2-21
2. Harries, A. C. [1986]: Child DevelopemntSt.Paul: West Pub. Unit IPP.5-17
3. Lerner &Jultsch, [1982]: Human Development : a life span perspective [pp.247-253] New York: Mccraw Hill Book Co.,
4. Saraswathi, T.S and Kaur, B[1993]: Human Development and family studies in India, new Delhi: Sage Publications, Unit VIII
5. Lerner, R. M &Hultsch, F. [1983]: Human Development: A life span perspective. New York: Harper and Row, Unit IPP.75-91, PP.117-140, Unit II, Unit IV
6. Craig, G. [1999]; Human Development N.J Prentice hall
7. Rice, F.P. [1965] Human Development – A life span approach, N.J Prentice Hall

**VI SEMESTER  
RESOURCE MANAGEMENT  
THEORY**

**BSHHSC382**

**Total - 36 hours  
3 hrs/ week**

**Specific Objectives:**

- To Develop an understanding of the Principles of Home Management
- To help students to develop experience and technique in the field of Household Equipments and Purchases.

**UNIT I**

9 hours

- Meaning & processes of Family Resource Management.
- Steps in Decision making and Types of Decisions
- Resources – classification, characteristics and factors affecting the use of resources

**UNIT II**

9 hours

- Time as a resource – steps in time plan, Tools in Time Management: peak load, work curve and ret period.

**UNIT III**

9 hours

- Energy- Fatigue, Types of Fatigue and relieving methods.
- Work simplification – Definition, principles and Techniques
- Mundels classes of change

**UNIT IV**

9 hours

- Household equipments – Use and care of different household equipment's: Cooking Stove, Refrigerator, Pressure Cooker, Oven, Mixer, Iron Box, Washing Machine And Vacuum Cleaner
- A study Modern gadgets available in the market



**PRACTICALS:**  
**BSHHSC388**

**Total – 36 hrs**  
**3 hrs/week**

- Survey of global resources ; Solar/ Water/ Wind,/biogas etc
- Time and Activity chart: for one full working day, half working day and a Holiday.
- Techniques of work simplification- Flow process chart / pathway chart with symbols and activity.
- A study on Peak loads for working women and Home maker with alternate time plans.
- Survey on Modern Household equipment available in the market.
- Drawing different types of kitchen plans.

**Course Outcomes**

- They can become good human relation officers
- Students can plan different types of kitchen plans efficiently

**REFERENCES:**

1. Deshpande, R.S [1980], Modern ideal homes for India, Education Deshpande Publications, India
2. Nickel, P. and Dorsey, J.M.[1986] Management in family living; 3<sup>rd</sup> edition, John Wiley & Sons New York.
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4. Varghese, Ogale and Srinivasan,’, Home Management’ Wiley Eastern Ltd., New Delhi.
5. BelaBharghava” Family Resource Management & Interior decoration (2005) University Book House (P) Ltd.,
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7. SushmaGuptha, NeeruGarg, AmitaAggarwal (1993) “Home Management Hygiene and Physiology” Kalyani Publishers. Ludhiyana

**VI SEMESTER  
PERSONAL FINANCE AND CONSUMER STUDIES  
THEORY**

**BSHHSC383**

**Total –36 hours  
3 hrs/week**

**Specific Objectives:**

- To know the nature of Saving and the Role of Saving
- To understand the Importance, role and protection of the Consumers

**UNIT - I**

9 hrs.

- Definition and types of Income – Money income, Real income and Psychic income
- Ways of supplementing family income

**UNIT - II**

9 hrs

**Family Budget and Income Tax:**

- Family budget - Definition, limitation, advantages, steps in making a budget and account keeping methods.
- Income tax – Type, Tax Implications and Calculation of Personal Income Tax

**UNIT - III**

9 hrs

- Savings – types, Importance, Factors affecting household savings
- Different Saving Institutions
- Investment – Objectives, Types, criteria for investment
- Insurance services: Types and Guidelines

**UNIT - IV**

9 hrs

- Consumer Education – importance, Rights, Responsibilities, problems and protection

**PRACTICALS:**  
**BSHHSC389**

**Total – 36 hrs.**  
**3 hrs/week**

- Analysis of household budget – Budget plans for 3 income groups
- Different Account keeping Methods
- Income tax Filing
- Study on Banks, Post offices to understand the services and to learn to fill different bank forms and types of check
- Consumer aids – Brands, Labels, Trademark and Advertisement

**Course Outcomes**

- Students can work as advisors in the areas of savings and can educate the people to become good consumers with their rights and responsibilities.

**REFERENCES:**

1. Gross et.al (1980); Management for modern families, 3<sup>rd</sup> edition, Prentice Hall, New jersey.
2. Nickel and Dorsey (1986); Management in family living, John Wiley and Sons.
3. Koontz and Weihrich (1980); Essentials of Management McGraw hill international Ltd.
4. PremavathySeetharaman and Praveen Pannu (2005) Interior Design and Decoration, CBS Publishers
5. AgarwalAnju.D(1989): A practical handbook for consumers, Indian Book Houses, Mumbai.

**VI SEMESTER  
FOOD PRESERVATION-II  
THEORY**

**BSHHSC384**

**Total - 36hrs  
3 hrs/week**

**Specific Objectives**

This course will enable students to:

- Understand basic concepts and parameters of preservation techniques
- Know the types and variety of foods available in the markets
- Learn to purchase and preserve different foods
- Learn various quality preservation techniques used in various foods

**UNIT I**

**9 hrs**

Types of heating: Conduction and convection heating. Microwave heating – advantages and disadvantages. Preservation of semi-moist foods / intermediate moist foods. Non-thermal Processing-Definition, principles, application, Infrared heating, High pressure processing, Pulsed electric field. Hurdle Technology-Principles, application, advantages and disadvantages

**UNIT II**

**9 hrs**

Preservation by use of low temperature: Freezing: Definition, general principles, advantages of frozen fruits and vegetables, limitations, methods of freezing, pre-treatment prior to freezing, air freezing, indirect freezing, direct contact freezing, immersion freezing, ice formation. Selection and preparation of foods for freezing. Changes during freezing, Freezer burn. Thawing. Effects of freezing on nutritive value. Refrigeration: Definition, general principles, selection of refrigerant. Chilling injury to food, approaches to control chilling injury.

**UNIT III**

**9 hrs**

Preservation by use of high temperature: High temperature: Effect of heat on texture, composition- nutrient and microbial. Definition, methods, advantages and disadvantages– Blanching, pasteurization and sterilization. Canning – definition, General principles, steps in canning / bottling of any one fruit and vegetable, Advantage and disadvantages of canning, Storage of canned foods. Process evaluation, thermal death time and heat penetration

**UNIT IV**

**9 hrs**

Preservation with chemicals: Characteristics of chemical preservatives, Classification of preservatives, Types and mode of action of organic and inorganic preservatives, uses, natural preservatives, antibiotics, antioxidant, anti-browning, cleaning, sanitizing and fungicidal agents – mode of action, uses. Health impacts use to excessive use of chemical preservatives

**PRACTICALS:  
BSHHSC390**

**Total - 36 hrs  
3 hrs/week**

1. Sauces – tomato ketchups, tomato sauce, red chilli sauce, green chilli sauce, tamarind sauce 5)
2. Chutney – Tomato chutney, various dry chutneys.
3. Syrups and squashes – Lemon squash, orange squash, pineapple squash, grape squash, mango squash.
4. Instant foods – Masalas.

**Course Outcomes**

- Students learn the parameters for preservation and they can work as quality managers in food preservation field. They can start their own business by the preparation of jams, jellies or chutneys and can become entrepreneurs.

**REFERENCES**

- Frazier WC, Westoff DC (1998), Food Microbiology 4th Ed., Tata Mc Graw Hill Publ. Co. Ltd
- Desroier NV (1963) The technology of food preservation, AVI Pub. Co
- Lal G, Siddappa GS, Tandon GL (1960) Preservation of food and vegetables, ICAR, New Delhi
- Potter NN, Hotchkiss JH (1966) Food Science, 5th Ed., CBS Publisher and Distributors, Delhi
- Prescott SC, Proctor BE (1937) Food Technology, McGraw Hill
- Johnson R, Anderson MT (2012) Food Preservation,
- Manay NS, Shadaksharaswamy M (2010) Foods - Facts and principles, New Age International Publ.,

**VI SEMESTER  
CHEMISTRY - IV  
THEORY**

**BSHHSC385**

**Total - 36 hrs  
3 hrs / week**

**Specific Objectives:**

This course will enable the students to:

- Enrich the knowledge about the basic principles, fundamental concepts and unique mechanistic steps involved in chemical and biochemical reactions
- Provide an introduction to key concepts of modern analytical methods and to equip the students to handle the modern analytical instruments
- Expose the students to the rapid development and enormous expansion of every phase of chemistry

**UNIT I**

9 hrs

- Electrochemistry: Specific equivalent and molar conductance, Kohlrausch's law, electrodes, electrode potential. Nernst equation. Reference electrode, working and construction of -Hydrogen electrode and calomel electrode, Quinhydrone electrode, glass electrode. Determination of equivalent conductance of NaCl. Conductometric titrations. Potentiometric titration. Determination of pH using quinhydrone electrode.
- Chemical equilibrium: Second and third law of thermodynamics, concept of entropy, Equilibrium constant and energy, Lechatelier's principle and its applications

**UNIT II**

9 hrs

- Stereochemistry of organic compounds: Stereoisomerism, types of stereoisomerism, optical isomerism. Elements of symmetry, asymmetric, atom molecular dissymmetry, chirality, optical isomerism in glyceraldehydes, lactic acid and tartaric acid, Enantiomers, diastereomers, meso compounds resolution of enantiomers and racemisation. Geometrical isomerism – condition, examples, geometrical isomerism in oximes. Conformational isomerism: conformational analysis of ethane and butane, Newman projection difference between configuration and conformation.

### UNIT III

9 hrs

- Heterocyclic compounds: Structural formula and importance of furan, pyrrole, thiophene, pyridine quinoline and isoquinoline, aromatic characteristics of pyrrole, furan, thiophene, pyridine, reactions.
- Terpenes: Classification isoprene rule, structure, and importance of limonene, menthol, camphor.
- Alkaloids: Classification biological functions with examples, structure and physiological action of LSD, morphine, nicotine, atropine.
- Polymers: Classification, properties of polymers, preparation and applications of PET, nylon-6,6, Bakelite, PVC, polythene, polypropylene, polystyrene

### UNIT IV

9 hrs

- Environmental Chemistry: Air pollution – air pollutants, their sources, effects and control. Water pollution: Types of water pollutants, biodegradation, dissolved oxygen level of water, Biochemical Oxygen Demand (BOD) of water, Chemical Oxygen Demand (COD) of water. Determination of DO, BOD and COD of waste water, industrial effluents, their effects, treatment of polluted water and sewage treatment. Soil pollution: pollutants, agricultural animal manures, crop harvesting. Pesticides. Use of fertilizers. Radioactive wastes. Control of soil pollution.
- Chromatography: General principles, adsorption and partition techniques. Paper chromatography, ascending and circular. R<sub>f</sub> values. Principle and applications of TLC, Column chromatography.

**PRACTICALS**  
**BSHHSC391**

**Total -36 hrs**  
**3 hrs/week**

Extraction of bio-molecules

1. Starch from potato
2. Caffeine from tea leaves
3. Casein from milk

Physical chemistry experiments (instrumental)

4. Conductometric titration of strong acid and strong base
5. Conductometric titration of acid mixture against strong base.
6. Verification of Beer-Lambert's law by colorimeter.
7. Potentiometric titration of Mohr's salt against Potassium dichromate.
8. Determination of pH of buffer by pH meter or potentiometer.
9. Determination of equivalent conductance of strong electrolyte.

Chromatography experiments

10. Identification of amino acids by circular paper chromatography
11. Separation of green leaf pigments by column chromatography

**Course Outcomes**

- Students will learn different areas in chemo
- They learn unique mechanics in chemistry

**REFERENCES**

1. Soni PL (1988) A textbook of Inorganic chemistry, Sulthan Chand & Sons
2. Lee JD (1988) Concise Inorganic Chemistry, Blackwell Science
3. Skoog DA, West DM, Holler JF (1993) Fundamentals of Analytical Chemistry, New York CBS Publ.
4. Gurudeep Raj (2001) A text book of Inorganic chemistry, Goel Publ. house, Meerut
5. Soni PL (2000) A textbook of Organic chemistry, Sulthan Chand & Sons
6. Bahl A and Bahl BS (2000) Advanced organic chemistry, Sulthan Chand & Sons



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8. Agarwal OP (1998) Chemistry of natural products, Goel Sulthan Chand & Sons Publ. House, Meerut
9. Madan RL, Tuli GD (2001) Physical Chemistry, Sulthan Chand & Sons
10. Raj Gurudeep (2001) Textbook of advanced Physical chemistry, Goel Publ. House, Meerut
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**VI SEMESTER  
FOOD MICROBIOLOGY - II  
THEORY**

**BSHHSC386**

**Total -36hrs  
3 hrs/week**

**Specific Objectives:**

To enable the students to:

- To understand the principles of various methods used in the prevention and control of microorganisms in foods
- To understand the criteria for Microbiological Safety in various Food operations to avoid public health hazards due to contaminated foods

**UNIT I**

9 hrs

- General principles underlying spoilage of food - Fitness and unfitness of food for consumption; Causes for spoilage. Factors affecting kinds and numbers of microorganisms in food. Factors affecting the growth of microorganisms in food.

**UNIT II**

9 hrs

- Microbiology of water – sources, bacteriological examinations, total count, test for E.coli. Purification of water – filtration, sedimentation, disinfection. Water borne diseases - bacterial, viral, protozoan. Microbiology of sewage and sewage disposal. Bacterial and Fungal Air Borne Diseases.

**UNIT II**

9 hrs

- Contamination and kinds of organisms causing spoilage of fruits and vegetables. Contamination and kinds of organisms causing spoilage of meat, poultry, fish and eggs. Contamination and kinds of organisms causing

spoilage of milk and milk products. Contamination and spoilage of fats and oils, bottled beverages, spices and condiments.

### **UNIT III**

9 hrs

- Food poisoning - Staphylococcal poisoning, Streptococcal poisoning, botulism, Salmonellosis, Shigellosis. Food borne infections - Clostridium perfringens, Vibrio, EPEC, Bacillus cereus, Campylobacter, Listeria, yersiniosis.

### **PRACTICALS**

**BSHHSC392**

**Total - 36 hrs**

**3 hrs/week**

- Estimation of lactic acid in milk
- Iodometric estimation of milk lactose.
- Quality tests for milk-Methylene Blue Reduction Test, Resazurin test, Phosphatase test, Turbidity test.
- Isolation of micro-organisms from food samples and spoiled vegetables
- Sampling of water-Membrane filtration technique.
- Standard Plate Count for water and milk samples.
- Coliform count for water and milk samples.
- Sampling of food handlers.
- Determination of microbial count of milk products.

### **Course Outcomes**

- Students will gain knowledge on prevention and control of micro-organisms in food
- Learn about microbial safety in food operations

### **REFERENCES**

1. Frazier WC, Westoff DC (1998) Food Microbiology 4th Ed., Tata McGraw Hill Publ. Co. Ltd
2. Jay JM (1986) Modern Food microbiology, 3rd Ed., Van No Strand Reinhold Co. Inc.
3. Pelezer ML, Reid RD (1978) Microbiology, McGraw Hill Book Co., New York

4. Brown A, Smith H (2015) Benson's Microbiological applications, McGraw Hill Publ.