



Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University Estd. u/s 3 of UGC Act 1956, Category 'A' by MHRD)
Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India

Department of Food Service Management and Dietetics
B.Sc. Food Service Management and Dietetics

Programme Outcomes:

1. Apply fundamental knowledge of food in dietetics for health and diseases and basics of food service management in food service operations.
2. Assess and interpret anthropometric, biochemical, clinical and dietary parameters of population groups.
3. Design menu and food service techniques to manage food service operations in terms of health, safety, economy and environment.
4. Manage diet related health issues.
5. Use basic techniques and technology in planning and preparing diets.
6. Apply skills in social and environmental context relevant to dietetics and food service management.
7. Exhibit professional ethics and norms for social development.
8. Function individually and in a team.
9. Demonstrate effective communication skills (verbal and written).
10. Organise and Manage the functions of dietary and other food service operations.
11. Apply use of acquired knowledge and skill in life.

Programme Specific Outcomes:

- 1.Acquire knowledge on basic principles of dietetics and food service management.
- 2.Translate skills in recommending dietary principles and management of food service.
- 3.Develop competency to take up higher education, employment and entrepreneurship.

Scheme of Instruction & Examinations
(for students admitted from 2021-2022 & onwards)

Part	Subject Code	Name of paper/ component	Hours of Instruction/week		Scheme of Examination				
			Theory	Practical	Duration of exam	CIA	CE	Total	Credit
First Semester									
Part I	21BLT001/ 21BLH001/ 21BLF001	Tamil - I Ilakiyam I, Ilakanam, IlakiaVaralaru/Hindi – I Prose and non-detail test/ French – I	5	-	3	50	50	100	4
Part II	21BLE001	English languagefor Communication-I	5	-	3	50	50	100	4
Part III		Core Courses							
	21BFDC01	Food Science	4	-	3	50	50	100	3
	21BFDC02	Principles of Nutrition	4	-	3	50	50	100	3
	21BFDC03	Food Science Practical	-	3	3	50	50	100	2
	21BFDC04	Principles of Nutrition Practical	-	4	3	50	50	100	2
Discipline Specific Elective									
	21BFDI01	Discipline Specific Elective (DSE) Course DSE – I : Perspectives of Home Science (FSMD)	4	-	3	50	50	100	3
		Games	-	1					
Second Semester									
Part I	21BLT002/ 21BLH002/ 21BLF002	Tamil – II Ilakkiam II, Ilakkanam, IlakkiaVaralaru/Hindi-II Grammar, Translation and General Essay /French – II	5	-	3	50	50	100	4
Part II	21BLE002	English Language for Communication-I	5	-	3	50	50	100	4
Part III		Core Courses							
	21BFDC05	Basics of Food Production	4	-	3	50	50	100	3
	21BFDC06	Operation Management	5	-	3	50	50	100	3
	21BFDC07	Basics of Food Production Practical	-	3	3	50	50	100	2
	Discipline Specific Elective								

	21BFDI02	Discipline Specific Elective (DSE) Course DSE – II : Chemistry Theory for Food Service Management and Dietetics (Chemistry)	4	-	3	50	50	100	3
	21BFDI03	DSE–II : Chemistry Practical for Food Service Management and Dietetics (Chemistry)	-	3	3	50	50	100	2
		Games	-	1					
*Catering Internship for six weeks during vacation									
Third Semester									
Part I	21BLT003/ 21BLH003/ 21BLF003	Tamil - III Ilakkiam III, Ilakkanam, IlakkiaVaralaru/ Hindi - III Ancient and Modern Poetry /French- III	5	-	3	50	50	100	4
Part II	21BLE003	English Language for Communication-III	5	-	3	50	50	100	4
Part III		Core Courses							
	21BFDC08	Meal Management	3	-	3	50	50	100	3
	21BFDC09	Human Physiology	4	-	3	50	50	100	3
	21BFDC10	Food Microbiology and Safety	5	-	3	50	50	100	3
	21BFDC11	Meal Management Practical	-	3	3	50	50	100	2
Discipline Specific Elective									
	21BFDI04	Discipline Specific Elective (DSE) Course DSE – III Computer Applications in Food Service (FSMD)	2	3	3	50	50	100	4
Fourth Semester									
Part I	21BLT004/ 21BLH004/ 21BLF004	Tamil – IV IlakkiamIV, Ilakanam, IlakkiaVaralaru/Hindi-IVIntroduction to Functional Hindi and Journalism/ French-IV	5	-	3	50	50	100	4
Part II	21BLE004	English Language for Communication-IV	5	-	3	50	50	100	4
Part III		Core Courses							
	21BFDC12	Diet Therapy	5	-	3	50	50	100	3
	21BFDC13	Bakery and Confectionery	3	-	3	50	50	100	3
	21BFDC14	Diet Therapy Practical	-	4	3	50	50	100	2
	21BFDC15	Bakery and Confectionery Practical	-	4	3	50	50	100	2
Discipline Specific Elective									

	21BFDI05	Discipline Specific Elective (DSE) Course DSE – IV Personality Development (Psychology)	4	-	3	50	50	100	3
** Dietetics Internship for six weeks during vacation									
Fifth Semester									
Part III		Core Courses							
	21BFDC16	Nutritional Biochemistry	4	-	3	50	50	100	3
	21BFDC17	Human Resource Management	5	-	3	50	50	100	3
	21BFDC18	Food and Beverage Service	5	-	3	50	50	100	3
	21BFDC19	Paediatric Dietetics	3	-	3	50	50	100	3
	21BFDC20	Nutritional Biochemistry Practical	-	3	3	50	50	100	2
	21BFDC21	Paediatric Dietetics Practical	-	3	3	50	50	100	2
	21BFDC22	Registered Dietitian Course (Self Study)	1	-	3	100	-	100	4
	21BFDC23	Food Service Management and Dietetics (Computer Based Test)	-	-	1	-	100	100	2
	21BFDC24	Internship #	-	-	-	100	-	100	6
		Generic Elective (GE) Course	2	-	3	100	-	100	2
#Internship - *Catering Internship-3 credits and**Dietetics Internship-3 credits after Semester II and Semester IV respectively									
Sixth Semester									
	21BFDC25	Management of Food Service	5	-	3	50	50	100	3
	21BFDC26	Entrepreneurship Development	4	-	3	50	50	100	3
	21BFDC27	Quantity Food Production	5	-	3	50	50	100	3
	21BFDC28	Food Product Development and Packaging	5	-	3	50	50	100	3
	21BFDC29	Quantity Food Production Practical	-	3	3	50	50	100	2
	21BFDC30	Food Product Development Practical	-	3	3	50	50	100	2
		TOTAL CREDITS							132

Semester	Subject Code	Name of Paper/Component	Hours of instruction/ week/Course	Credit/ Course	Total Credits
Part IV Components					
A.Ability Enhancement Courses(AEC)					
I	21BAES01	Environmental Studies (Foundation Course)	4	Remarks	4
II	21BAFU01	Fundamentals of Research	2	Remarks	2
V	21BSCS01	Communication Skills	3	Remarks	2
VI	21BSSS01	Soft Skills	3	Remarks	2
B.Skill Enhancement Courses (SEC)					
III		Value Added Course (from a basket of choices offered)	40 hrs. duration	Remarks	2
IV		Co-curricular Courses Add on Certificate/Quantitative Aptitude/Certificate Courses- Gandhian Studies/Women's Studies/ Ambedkar Studies/ Verbal and Non-Verbal Reasoning/General Awareness/others as per list	Varied duration	Remarks	2
B.Extra-Curricular Course					
I-VI	21BXNC01-06/ 21BXNS01-06/ 21BXSP01-06	NCC/ NSS/ Sports	-	-	Remarks 24 6 6
Total Credits					20

* For NCC Students, 38 Credits for Part IV Components.

Total credits to earn the degree

1.	Part I, II & III Components	-	132
2.	Part IV Components	-	20

	Total Credits	-	152

Other Courses offered by the Department

Discipline Specific Electives			
21BTOI01	Travel Catering	For BBA. Tourism students	During 1 st Semester (Hours of Instruction Per week : 4)
21BHDI02	Food Service in Child Care Centers	For B.Sc Human Development students	During 2 nd Semester (Hours of Instruction Per week : 4)
21BPSI04	Lifestyle Health	for B.Sc.Psychology students	During 4 th Semester (Hours of Instruction Per week : 4)
Generic Elective Course			
21BFDO01	Lifestyle Practices	Any major other than FSMD	During 5 th Semester
Value Added Course			
21BFDV01	Culinary Skills	Any major other than FSMD	During 3 rd Semester
Co curricular Course			
21BSCFD1	Culinary Arts and Food Styling	Any major other than FSMD	During 4 th Semester

Food Science

Semester I
21BFDC01

Hours of instruction per week: 4
No. of credits: 3

Course Objectives:

1. Obtain knowledge of different food groups and their nutrient content.
2. Understand the scientific principle of food and apply it in food preparation.
3. Develop new food products ensuring food quality.

	Hours
Unit I Functions of food, cooking and processing of cereal and pulses Food groups, functions of food, principles and need for cooking, water and fat as medium of heat, merits and demerits. Germination, malting and fermentation, fortification and enrichment. Structure and nutritive value, cooking of cereals. Nutritive value, pulse cookery and uses, toxic factors, improvement of pulse protein quality.	9
Unit II Vegetables and Fruits Classification, pigments, composition and nutritive value of vegetables and fruits, their selection and storage, vegetable and fruit cookery.	12
Unit III Milk and milk products and eggs Composition, nutritive value, different types of milk and milk products, preservation and milk cookery. Composition, nutritive value, evaluation of egg quality and egg cookery.	17
Unit IV Meat, poultry and fish Classification, composition and nutritive value, post mortem changes, aging and tenderizing. Cooking and preservation of meat, poultry and fish.	12
Unit V Spices, nuts and oil seeds, Fats, Sugar and sugar products , food additives and food adulterants Classification and uses of spices and condiments, nuts and oil seeds, different forms of sugar, stages of sugar cookery and its uses in cookery. Processing and changes in storage and cooking, role of fat in cookery. Types and functions, different food adulterants, measures to control adulteration	10
Total Hours	60

Text Books:

1. **Rajagopal, M.V, Rao, S.M., Mudambi, S.R. (2013).** Food Science. Revised Second Edition. New Age International (P) Limited, New Delhi.
2. **Chandrasekhar, U (2002).** Food Science and Applications in Indian Cookery. Phoenix Publishing House Pvt ltd.
3. **Srilakshmi, B (2002).** Food Science. New Age International Limited, New Delhi.

Reference Books:

1. **Parker, R (2003).** Introduction to Food Science. Delmer Publications, U.S.
2. **Potter.N. and Hotchkiss.J.H (1998).** Food Science. fifth edition. CBS publication and distributors Daryaganji, New Delhi.
3. **Freeland-Graves, J.H and Peckham, G.C. (1996).** Foundations of Food Preparation. Sixth Edition, Englewood Cliffs, N.J., Merrill.

Websites:

1. <https://www.fda.gov>
2. <https://foodscience.ucdavis.edu>
3. <https://ncert.nic.in>

Course Outcomes:

1. Understand the various food groups ,their functions ,nutrient composition and properties
2. Acquire knowledge on different methods of cooking and their characteristics.
3. Apply different processing skills on food and food products
4. Choose appropriate foods for menu planning and for development of food products.
5. Evaluate foods for quality standards and ensure food safety.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	L	L	M	M	H	M	M	-	H	H	H	M	-
CO 2	M	L	H	M	M	-	H	M	-	H	M	H	M	L
CO 3	M	-	M	L	L	M	M	-	-	M	M	M	M	M
CO 4	L	L	-	L	-	M	-	H	-	H	H	H	H	M
CO 5	H	-	L	M	L	L	M	L	-	H	-	L	L	M

Principles of Nutrition

Semester I
21BFDC02

Hours of instruction per week: 4
No. of credits: 3

Course Objectives:

1. Understand the vital link between nutrition and health.
2. Gain knowledge on functions, sources and effects of macro and micronutrients.
3. Acquire skills on the requirements of nutrients.

	Hours
Unit I Nutritional status and Energy balance	12
The relation of good nutrition to normal physical development and sound health, Methods of assessing nutritional status – anthropometry, biochemical, clinical and diet survey. Definition of Caloric and Joule, Measurement of Calorific value of foods, basal metabolism, specific dynamic action of foods, direct and indirect calorimetry.	
Unit II Carbohydrates, Proteins and Lipids	15
The proximate principles: classification, sources, functions, digestion, absorption, metabolism, requirements and effect of deficiency of carbohydrate, proteins and lipids, evaluation of protein quality.	
Unit II Minerals	12
Functions, sources, requirements, and deficiency diseases of calcium, phosphorus, magnesium, sodium, potassium, iron, copper, cobalt, zinc, iodine, manganese, fluorine, molybdenum, selenium and chromium.	
Unit IV Vitamins	12
History, classification, functions, sources, requirements and deficiency diseases of Vitamin A, Vitamin D, Vitamin E, Vitamin K, Ascorbic acid, Thiamine, Riboflavin, Niacin, Pyridoxine, Pantothenic acid, Folic acid and Cyanocobalamin.	
Unit V Water and Fibre	9
Importance of water balance. Fibre – definition, types, sources, functions of fibre, digestion and absorption of fibre.	
Total Hours	60

Text Books:

1. **KalpanaBhardwaj (2011).** Fundamentals of Diet and Nutrition. Ankit Publishing House Delhi.
2. **Frances Sizer and Ellie Whitney (2006).** Nutrition concepts and controversies. International Student Edition. 10th Edition. Thomsos Learning Inc.
3. **MichealJ.Gibney, Lan A. Macdonald and Helen M.Roche (Ed) (2004).** Nutrition and Metabolism. Blackwell Publishing.
4. **Martin Eastwood (2003).** Principles of Human Nurition. 2nd Edition. C.V.Mosby Company.

Reference Books:

1. **Eugene Lyman (Ed), Florence Daniel, Ruth A Wardel, Harry Syder, Adelle Davis (2009).** Food Science and Nutrition. Vol 2. Shree Publishers and Distributors, New Delhi.
2. **Joshi, S. A (2007).** Nutrition and Dietetics. Tata McGraw-Hill publishing Company Ltd. New Delhi.
3. **Paul Insel, Elaine turner and Don Ross (2007).** Nutrition. Jones & Barlett publishers Inc.
4. **Mahan, L.K. and Stump, S.E (2004).** Krause's Food, Nutrition and Diet Therapy. 11th Edition. W.B. Saunders Co.
5. **Sanders, T. and Emery (2004).** Parenteral, Molecular basis of Human Nutrition. Mosby Publication.
6. **Whitney, Cataldo and Rolfes (2002).** Understanding Normal and Clinical Nutrition. Wadsworth Thomson learning, USA.

Websites:

1. <https://www.ift.org/>
2. <https://link.springer.com/>
3. <https://www.mcgill.ca>

Course Outcomes:

1. Assess nutritional status of population groups and educate the importance of nutrients .
2. Comprehend the functions of macro and micronutrients with health and deficiency disorders
3. Identify symptoms for deficiency disorders.
4. Relate metabolism of macro and micronutrients with nutritional status of individuals and community.
5. Translate nutrient needs into dietary recommendation for individuals, different age groups considering cultural, religions and social diversification.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	L	H	-	H	-	M	L	M	L	-	H	-	H	M
CO 2	L	H	M	H	M	L	-	L	-	M	M	L	H	M
CO 3	-	H	-	H	-	-	M	M	L	-	M	L	H	M
CO 4	M	H	M	H	M	M	M	-	L	M	M	-	H	M
CO 5	L	M	M	M	H	-	L	M	L	L	H	-	H	M

Food Science Practical

Semester I
21BFDC03

Hours of instruction per week: 3
No. of credits: 2

Course Objectives:

1. Understand measurement of ingredients, and edible portion.
2. Learn different methods of cooking.
3. Gain knowledge on effect of cooking in different types of foods.

	Hours
Unit I Measuring Ingredients Methods, determination of edible portion, effect of cooking on volume and weight.	9
Unit II Cereal cookery, pulse cookery Methods of combining starch with water . Common method of cooking cereals, Gelatinization, examination of starches, Common methods of cooking pulses (soaked and unsoaked) Roasting and puffing of cereals and millets	6
Unit III Cooking of Vegetables and Fruits Experimental cookery, methods of preventing darkening of fruits and vegetables, preparation of common recipes with fruits and vegetables.	12
Unit IV Milk, egg, meat and poultry cookery Experimental, common methods of cooking milk and milk products Common methods of cooking flesh foods (meat, poultry and fish) Common methods of cooking egg.	12
Unit V Fats and oils, sugar cookery Smoking temperature of different fats and oils, frying foods at smoking temperature. Stages of sugar cookery, preparation of fondant, fudge, halwa and brittles	6
Total Hours	45

Text Books:

1. **Rajagopal, M.V., Rao, S.M., Mudambi, S.R. (2013).** Food Science. Revised Second Edition. New Age International (P) Limited, New Delhi.
2. **Chandrasekhar, U (2002).** Food Science and Applications in Indian Cookery. Phoenix Publishing House Private Limited.
3. **Srilakshmi, B (2002).** Food Science. New Age International Limited, New Delhi.

Reference Books:

1. **Parker, R (2003).** Introduction to Food Science. Delmer Publications, U.S.
2. **Potter, N. and Hotchkiss, J.H (1998).** Food Science. Fifth edition. CBS publication and distributors Daryaganji, New Delhi.
3. **Freeland-Graves, J.H and Peckham, G.C. (1996).** Foundations of Food Preparation. Sixth Edition, Englewood Cliffs, N.J., Merill.

Websites:

1. <https://www.fda.gov>
2. <https://foodscience.ucdavis.edu>
3. <https://ncert.nic.in>

Course Outcomes:

1. Understand experimental cookery.
2. Determine edible portion of raw foods, volume and weight of cooked foods.
3. Acquire skills on different methods of cooking.
4. Choose appropriate cooking methods to conserve nutrients.
5. Evaluate raw and cooked foods for quality standards

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	-	L	M	L	L	-	L	-	M	H	H	M	L
CO 2	H	H	L	M	L	H	M	M	-	M	H	H	H	-
CO 3	H	M	L	M	M	M	-	L	-	M	H	H	H	M
CO 4	M	L	M	H	M	M	M	-	-	M	H	H	M	M
CO 5	H	-	M	L	L	M	M	L	-	-	H	H	M	H

Principles of Nutrition Practical

Semester I
21BFDC04

Hours of instruction per week: 4
No. of credits: 2

Course Objectives:

1. Gain competence in using various equipments for analysis.
2. Gain skills on Qualitative analysis of macro and micronutrients.
3. Acquire skills on Quantitative analysis of carbohydrates, vitamins and minerals.

	Hours
Unit I Carbohydrates Qualitative tests for Sugars- glucose, fructose, lactose, maltose, sucrose and Quantitative estimation of glucose	16
Unit II Proteins Qualitative tests for proteins	12
Unit III Lipids Analysis of composition, body fat. Demonstration and analysis of lipid fractions.	12
Unit IV Minerals Qualitative tests for minerals, quantitative estimates of calcium, phosphorus and iron	12
Unit V Vitamins Quantitative estimation of ascorbic acid and cooking loss of ascorbic acid	8
Total Hours	60

Text Books:

1. **Kalpna Bhardwaj (2011).** Fundamentals of Diet and Nutrition. Ankit Publishing House Delhi.
2. **Frances Sizer and Ellie Whitney (2006).** Nutrition concepts and controversies. International Student Edition. 10th Edition. Thomsos Learning Inc.
3. **Micheal J. Gibney, Lan A. Macdonald and Helen M. Roche (Ed) (2004).** Nutrition and Metabolism. Blackwell Publishing.
4. **Martin Eastwood (2003).** Principles of Human Nutrition. 2nd Edition. C.V. Mosby Company.

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1. **Eugene Lyman (Ed), Florence Daniel, Ruth A Wardel, Harry Syder, Adelle Davis (2009).** Food Science and Nutrition. Vol 2. Shree Publishers and Distributors, New Delhi.
2. **Joshi, S. A (2007).** Nutrition and Dietetics. Tata McGraw-Hill publishing Company Ltd, New Delhi.
3. **Paul Insel, Elaine turner and Don Ross (2007).** Nutrition. Jones & Barlett publishers Inc.
4. **Mahan, L.K. and Stump, S.E (2004).** Krause's Food, Nutrition and Diet Therapy. 11th Edition. W.B. Saunders Co.
5. **Whitney, Cataldo and Rolfes (2002).** Understanding Normal and Clinical Nutrition. Wadsworth Thomson learning, USA

Websites:

1. www.healthline.com
2. www.webMD.com
3. www.medpub.com

Course Outcomes:

1. Gain knowledge on experimental procedures.
2. Acquire skills to handle laboratory equipments .
3. Perform qualitative analysis of macro and micro nutrients
4. Carry out quantitative analysis of micro and macro nutrients
5. Interpret the analysed value of nutrient content for adequacy .

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	H	M	H	M	L	-	-	L	M	H	-	L	H
CO 2	L	H	-	L	H	-	M	M	-	M	M	L	H	H
CO 3	-	H	M	M	H	M	M	M	L	M	M	-	L	H
CO 4	L	H	M	H	M	-	L	L	-	-	M	L	H	H
CO 5	-	H	M	H	L	L	-	M	L	M	H	L	M	H

Discipline Specific Elective (DSE) Course DSE – I : Perspectives of Home Science (FSMD)

Semester I
21BFDI01

Hours of Instruction per week: 4
No. of Credits: 3

Course Objectives:

1. Understand the concept and scope of Home science and its components.
2. Know the trends and job opportunities in home science.
3. Enable the students to gain knowledge on different areas of home science.

Hours

Unit I Meaning and Components of Home science

10

Meaning of Home Science education – Philosophy of home and family , Components of Home science, career perspectives –its relation to other disciplines – science and humanities
The Home science Association of India- history and objectives, achievements of the Association – representation in National bodies.

Unit II Interior Design and Resource Management and Textile and COthing

15

Concept of Interior design - Importance of good taste, components of an artistic interior – design, elements and principles
Resource classification, characteristics and type of goals, values and standards, values to be imbibed by youth
Textile Fiber – definition, classification – natural and manmade. Yarn- definition, types of yarn – simple and novelty yarns, Fabric – definition, types of fabric; woven knitted and non-woven. Apparel – selection, care and stain removal methods.

Unit III Foods and Nutrition and Food Service Management and Dietetics

15

Classification of foods according to function and origin of food groups
Balanced diet – Meaning and importance of balanced diet, meal planning, Macro and micro nutrients of foods.
Introduction to dietetics, Principles of diet therapy, aims, objectives, classification of commercial and non-commercial food service operations, Indian cuisines and their features, Setting up a cover and simple service.

Unit IV Human development

10

Human Development – definition, goals, domains and stages
Prenatal development and its stages, Infancy, Childhood and Adolescence – characteristics and developmental tasks
Adulthood and Old age – characteristics and problems
Parenting styles – authoritarian, authoritative and permissive

Unit V Human Science Extension Education

10

Meaning, definition, objectives, philosophy and principles of extension education, third dimension of Higher Education, Home science extension service at various levels – village, block and district level, Role of home science extension in rural and national development

Total Hours 60

Text Books:

1. **Ray G.L (2013).**Extension Communication and Management.Kalyani Publications, India.
2. **Dahama.O.P.,andBhatnagar.O.P.,(2012).**Education and Communication for Development.New Delhi, Oxford and IBH Publishing Co. Pvt Ltd, India.
3. **Reddy A.A (2010).**Extension Education.Bapatla: Sri Lakshmi Press, India.
4. **Jalihal, K.A and Veerabhadran, V.(2007).**Fundamentals of Extension Education and Management in Extension.Concept Publishing Company, New Delhi.
5. **Premalata, M,(2007).**Text Book of Home science.Kalyani Publishers, Chennai.
6. **Pundir, N.(2007).**Fashion Technology – Today, Tomorrow.New Delhi, Mittal Publications, India.
7. **Nisha, M.(2006).**Wings of Home Science. New Delhi: KalpazPublications,India.
8. **Frings, G.S.(2005).**Fashion from Concept to Consumer.7th edition, New Delhi: Pearson education, India.

Reference Books:

1. **SeemaSekhri, (2011).**Textbook of Fabric Science, Fundamentals to finishing.New Delhi: PHI Learning Private Limited, India.
2. **Sethi.M.(2011).**Institutional Food Management.New Age International (P) Limited
3. **MeenakshiRastogi. (2009).**Fibres and Yarn.New Delhi: Sonali Publications, India.
4. **Andrews.S.(2008).**Text book of Food & Beverage Management.Tata McGraw – Hill Publishing Company Limited

Websites:

1. <http://www.jnkvv.org>
2. <https://www.apa.org>

Course Outcomes:

1. Gain fundamental knowledge in Home science.
2. Educate population on relevance of nutrients and to recommend a balanced diet for different age.
3. Acquire basic skills in child rearing practices
4. Promote healthy lifestyle in community.
5. Plan and recommend a balanced diet for different age groups.

Basics of Food Production

Semester II
21BFDC05

Hours of instruction per week: 4
No. of credits: 3

Course Objectives:

1. Learn menu planning and basic techniques of food production.
2. Acquire skill in preparing recipes.
3. Gain knowledge on cuisines around the world.

	Hours
Unit I Menu planning Menu pattern, factors influencing menu planning, types of menu, construction of menu, menu writing, presentation and display.	10
Unit II Preparation Techniques Handling knife, basic cuts and shapes, cutting techniques, preliminary cooking – blanching, marinating and preparation for frying. Equipments used in food production. Fuel conservation. Hygiene and sanitation.	10
Unit III Methods of cooking Moist heat methods – boiling, simmering, steaming, pressure cooking, poaching. Dry heat methods – frying, sautéing, grilling, toasting and baking. Combination method – braising.	10
Unit IV Stocks, soups, sauces, gravies and salads Stocks- Ingredients, procedures – reduction, glazes and convenience bases. Soups – types, uses and method of preparation. Sauces- functions and structure, roux, thickening agents and finishing techniques. Gravies (Indian) - basic gravies: yellow, white, green, makhni and Chettinadu gravy. Salads and salad dressings- types, ingredients, arrangements , garnishing and presentation	15
Unit V Cuisines around the world Culinary terms, ingredients used, characteristics of menu and preparation methods of Indian, Chinese, Continental, French, Italian, Mexican and Arabian cuisines.	15
Total Hours	60

Text Books:

1. **Sethi M. and Malhan S.M. (2015).** Catering Management an Integrated approach. 3rd edition. Published by New Age International Private Limited.
2. **Parvinder S. Bali (2011).** Quantity Food Production Operations and Indian Cuisine, published by Oxford University Press.
3. **Thangam Philip (2005).** Modern Cookery. 3rd edition. Orient Longman Limited.

Reference Books:

1. **John Cousins, Dennis, Lillicrap, Suzanne Weekes (2014).** Food and Beverage Service. 9th edition, published by Hachette UK.
2. **Khan, M.A (2003).** Food Service Operations. AVI Publications Co., Connecticut.
3. **Cessarani, V. Kinton, R (2002).** Practical Cookery. seventh edition. Hodder and Stoughton publishers.

Websites:

1. <https://www.acsedu.co.uk>
2. <https://www.britannica.com>
3. <http://www.fao.org>

Course Outcomes:

1. Understand the objectives and importance of basic cooking .
2. Comprehend the characteristics of different cuisines.
3. Select and use different food production equipment.
4. Demonstrate various pre-preparation and preparation techniques.
5. Plan and write different types of menu for food service outlets.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	L	-	M	L	L	L	M	L	M	M	H	L
CO 2	H	H	L	M	L	-	M	H	-	M	H	H	H	M
CO 3	H	-	M	M	M	-	M	M	-	M	H	H	H	L
CO 4	H	M	L	M	H	L	-	H	-	L	H	H	M	-
CO 5	H	M	-	M	-	L	M	M	-	M	M	M	L	L

Operation Management

Semester II
21BFDC06

Hours of instruction per week : 5
No. of Credits: 3

Course Objectives:

1. Understand the functioning of front office and housekeeping departments of hotels.
2. Gain knowledge on layout and space allocation in kitchen.
3. Develop skills in handling food service equipment.

	Hours
Unit I Front Office Management Functions of front office, Organization and staffing of Front office, Guest cycle - Types of guest and key hotel terms, Modes and types of reservation, Basic reservation procedure/ activities, computerized reservation system, telephone communication and etiquette, check-in procedures for guest arrival and check-out procedures, modes of bill settlement.	15
Unit II House Keeping Functions, Organization and staffing of housekeeping department, Functions of linen room, bed making. Types of cleaning equipments and cleaning agents. Types of fire accident, prevention and control. Security measures, first aid and pest control.	15
Unit III Food Facility Layout Principles of kitchen planning, Types of kitchens, Functional work areas and space relationship, working heights and flow of traffic. Storage area, pot and pan wash areas, types of fuel and fuel economy.	15
Unit IV Equipment Classification, factors affecting selection of equipment, features of equipment, designing, care and maintenance of electrical and non-electrical food service equipment, base materials, its strength and limitations, finishes, insulation materials.	15
Unit V Professional ethics Personal grooming, relationship of housekeeping and front office with other departments, modes of communication and etiquette, coordination with other departments, handling guest complaints.	15
Total Hours	75

Text Books:

1. **Andrews, S (2013).**Hotel Housekeeping Training Manual.Tata McGraw – McGraw Hill Publishing Co Ltd, New Delhi.
- 2.**James A. Bardi (2010).**Hotel front office management, 5th edition; John wiley& Sons, Inc.
- 3..**Kinton, R., Cessarani, V. and Foskett, D (2009).**The Theory of Catering. Hodder and Stoughton.

Reference Books:

- 1.**K.S. Negi(2011),** A textbook of Hotel Management, wisdom press.
- 2.**Michael , J. O Fallon and Denny G. Rutherford(2011).**Hotel Management and Operations, 5th edition, John Wiley and sons.
- 3.**Sethi, M (2011).**Institutional Food Management. Second edition .New age International (P) Limited.

Websites:

- 1.<https://www.ift.org/>
- 2.<https://link.springer.com/>
- 3.<https://www.mcgill.ca>

Course Outcomes:

- 1.Acquire knowledge and skills necessary to work in various departments of food service establishments.
- 2.Understand and obtain skills required to perform tasks in different functional areas of food production.
- 3.Select and operate various electrical and nonelectrical equipment in a food service.
- 4.Imbibe professional ethics.
- 5.Obtain skills in handling guests.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	L	H	L	-	M	L	M	M	H	M	H	M	H
CO 2	H	L	H	-	L	M	L	M	M	H	M	H	M	L
CO 3	M	-	M	L	-	-	M	M	L	L	M	H	M	M
CO 4	H	L	M	-	-	M	H	M	M	-	H	H	M	M
CO 5	M	-	M	-	L	M	H	M	M	M	H	M	M	M

Basics of Food Production Practical

Semester II
21BFDC07

Hours of instruction per week: 3
No of credits: 2

Course Objectives:

1. Learn menus of different cuisines
2. Understand basic methods of cooking
3. Gain knowledge on preparation of different recipes and cuisines

	Hours
Unit I Writing Menus North Indian, South Indian, Central Region Indian, Continental cuisines, Religious festivals and events.	6
Unit II Methods of cooking Recipes for each method of cooking – boiling, steaming, poaching, simmering, pressure cooking, frying, grilling, baking, toasting, braising and microwave cooking.	6
Unit III Stocks, soups, sauces, gravies and salads Cuts of vegetables, basic stocks, soups- thin, thick and cream soup, sauces- white sauces, brown sauces, roux, veloute and béchamel. Types of gravies, thickening agents for gravies. Salads- main and accompaniment salads.	9
Unit IV Production of Indian Cuisines Three menus which include Veg. dishes, Non-Veg. dishes, accompaniment & snacks, cold drinks & Indian salad, special Indian dishes (Tandoori and Kebab preparation), pudding and fruits.	12
Unit V Production of continental, French, Italian, Mexican and Arabian cuisines Menu each for French, Italian, Mexican and Arabian cuisines.	12
Total Hours	45

Text Books:

1. **June Payne-Palacio (2009).** Monica Theis, Introduction to Foodservice 11th illustrated, Published by Pearson/Prentice Hall.
2. **Bernard Davis, Andrew Lockwood, Peter Alcott, Ioannis Pantelidis (2008).** Food and Beverage management, 4th edition, published by Butterworth-Heinemann.
3. **Thangam Philip (2005).** Modern Cookery. Third edition .Orient Longman

Reference Books:

1. **Sethi M. and Malhan S.M. (2015).** Catering Management an Integrated approach 3rd edition, published by New Age International Private Limited.
2. **Parvinder S. Bali, (2011).** Quantity Food Production Operations and Indian Cuisine, published by Oxford University Press.
3. **Cassarani, V. Kinton, R (2002).** Practical Cookery. seventh edition. Hodder and Stoughton publishers.

Websites:

1. <http://idaindia.com/>
2. <https://jandonline.org/>
3. <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/dietetics>

Course Outcomes :

1. Plan menu for various cuisines and occasions.
2. Use major and minor food processing equipment.
3. Prepare main course and accompaniments.
4. Acquire skills on food designing and food presentation.
5. Maintain food safety and sanitation.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO 2	PSO3
CO 1	H	-	L	M	M	M	-	L	M	M	H	H	H	H
CO 2	H	H	L	-	L	H	M	M	-	M	H	H	H	H
CO 3	H	-	L	M	L	H	-	M	-	M	H	H	H	H
CO 4	H	M	L	-	L	H	M	M	-	M	H	H	H	H
CO 5	H	H	L	M	L	H	M	M	-	M	H	H	H	H

Meal Management

Semester III

21BFDC08

Hours of instruction per week: 3

No. of Credits: 3

Course Objectives:

1. Acquire knowledge on the nutritional requirements for various age groups.
2. Comprehend the principles of planning diets for the age groups.
3. Develop skill to plan balanced diets for various stages of life.

Content	Hours
Unit I Recommended Dietary Allowances (RDA) and Meal Planning	11
Balanced diet, food pyramid, food groups, Meal planning-objectives, principles steps and factors. Basis for recommending the Dietary Allowances, purpose of RDA, factors affecting RDA for Indians – Reference man and woman.	
Unit II Nutrition in Pregnancy and Lactation	9
Physiological stages, nutritional requirements, food selection, complications of pregnancy. Physiology of lactation and nutritional requirements.	
Unit III Nutrition during Infancy and Early Childhood	9
Growth and development during infancy, nutritional requirements, breast feeding and its advantages, infant formulae, introduction of supplementary foods. Growth and nutrient needs during childhood, nutrition related problems, feeding patterns.	
Unit IV Nutrition for School Age and Adolescence	9
Growth and nutrient needs, nutritional requirements, importance of healthy snacks, school lunch, food choices and factors influencing eating habits, good eating practices.	
Unit V Adult and Geriatric Nutrition	7
Nutritional requirements for adults, healthy food choices; Factors affecting nutrient requirements, factors affecting food intake and choice of foods, nutrient needs and RDA, nutrition related problems.	
Factors affecting nutrient requirements, factors affecting food intake and choice of foods, nutrient needs and RDA, nutrition related problems.	
Total Hours	45

Text Books:

1. **National Institute of Nutrition (2011).** Dietary guidelines for Indians- A manual Second Edition, Hyderabad.
2. **Drummond, K.E. and Brefer, L.M (2004).** Nutrition for food service and Culinary Professionals. John Wiley and Sons, New York.
3. **Robinson, B.W. Williams, S.R (2000).** Nutrition Through Life Cycle. McGraw Hill Higher Education, New York.

Reference Books:

1. **National Institute of Nutrition (2010)**, Nutrient requirements and recommended dietary allowances for Indians, Hyderabad.
2. **Joshi, S. A (2007)**. Nutrition and Dietetics. Tata McGraw-Hill publishing Company Ltd, New Delhi
3. **Mahan, L.K. and Stump, S.E (2004)**. Krause's Food, Nutrition and Diet Therapy. W.B. Saunders Co.

Websites:

1. <https://www.food-management.com>
2. <https://www.ncbi.nlm.nih.gov>
3. <https://nofoodwaste.org>
4. <https://eatrightindia.gov.in>
5. <https://www.akshayapatra.org>

Course Outcomes:

1. Construct a balanced meal.
2. Comprehend and relate the physiological changes and nutritional requirements in pregnancy and lactation meal planning.
3. Suggest infant supplementary feeds and plan meals for preschool children.
4. Understand nutrient needs and demonstrate food choices for school going children and adolescents
5. Develop suitable menus for geriatric population.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	H	M	H	M	L	M	L	L	H	M	M	L
CO 2	H	H	H	M	H	M	L	M	L	L	H	M	M	L
CO 3	H	H	M	M	H	M	L	H	L	M	H	M	H	L
CO 4	H	M	H	M	L	M	L	H	L	M	H	M	H	L
CO 5	H	H	H	M	H	M	L	M	L	H	H	M	M	L

Human Physiology

Semester III
21BFDC09

Hours of instruction per week: 4
No. of credits: 3

Course Objectives:

1. Understand the structure of various organs in the body.
2. Comprehend the functions of the various systems.
3. Interrelate the system functions in health.

	Hours
Unit I Blood and Cardiovascular system	8
Composition and functions, plasma proteins, homeostasis, coagulation, Red Blood Corpuscles, White Blood Corpuscles, platelets, blood groups. Structure of heart and blood vessels, properties of cardiac muscle, functional tissues, Cardiac cycle, heart rate, cardiac output, blood pressure and radial pulse	
Unit II Digestive and Excretory system	8
Anatomy of the digestive tract, liver and pancreas. Excretory system: Structure of kidney, nephrons, urine formation, composition of urine and micturition	
Unit III Respiratory and Endocrine system	8
Anatomy of respiratory tract, mechanics of respiration, transport of respiratory gasses in blood, gaseous exchange in lungs and tissues, regulation of respiration. Structure and functions of pituitary gland, Thyroid gland, parathyroid gland and adrenal gland and endocrine functions of pancreas.	
Unit IV Nervous System	20
Introduction to nervous system, Neuron structure and functions, Brain structure and functions, Sympathetic and parasympathetic nervous system.	
Unit V Reproductive System	16
Reproductive system: Anatomy of male and female reproductive organs, physiology of Menstruation, pregnancy and the associated changes, placenta, mammary gland and lactation.	
Total Hours	60

Text Books:

1. **Guyton and Hall (Arthur C. Guyton and John E. Hall) (2016)**, Functions of the Human Body., Thirteen edition, Rebecca Grunion Publishing service, Philadelphia.
2. **Sembulingam (2000)**. Essentials of Medical Physiology. Second Edition. Jaypee brothers Medical Publishers (P) Ltd, New Delhi
3. **Chatterjee Chandi Charan**. Textbook of Medical Physiology, London W.B.
4. **Best and Taylor (1992)**. The physiological basis for medical practice. Saunders Company.

Reference Books:

1. **Indu Khurana (2014)**, Medical physiology, Second edition, Reed Elsevier India Private limited.
2. **Robert F. Schmidt and Gerhard Thews (2013)**, Human Physiology, Springer Science & Business media.
3. **Lauralee Sherwood (2011)**, Fundamentals of human physiology, Fourth edition Brooks Cole cengage learning.
4. **Waugh and Grant (2010)**. Ross and Wilson Anatomy and Physiology in health and illness. 11th edition. Elsevier.
5. **Ravi Kumar Patti, H. S. Makari, H.K. Gurumurthy H, Sowmiya S.V. (2009)**, A Textbook of human physiology" I. K. International publishing house Pvt., Limited
6. **Harbakhsh Singh Sandhar (2004)**, Textbook of Physiology, First edition, B. Jain publisher Pvt. Ltd,
7. **J. Tortora and Grabowski (2003)**. Principles of Anatomy and physiology. John Wiley and Sons. Inc.

Websites:

1. <https://www.hapsweb.org>
2. <https://www.physoc.org>
3. <https://www/iups.org>
4. <https://training.seer.cancer.gov>
5. <https://education.rajasthan.gov.in>

Course Outcomes:

1. Understand and distinguish the functions of organs in the body.
2. Comprehend the anatomy of the various organs.
3. Illustrate the processes of the respective system.
4. Get sensitized about the reproductive system and functions.
5. Elaborate the regulation of body fluids and blood parameters.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	L	-	L	L	-	-	-	-	L	L	M	L	M
CO 2	M	L	-	L	L	-	-	-	-	L	L	M	L	M
CO 3	L	-	-	L	-	-	-	-	-	L	L	M	L	M
CO 4	L	-	-	L	-	-	-	-	-	L	L	M	-	M
CO 5	M	L	-	L	L	-	-	-	-	L	L	M	L	M

Food Microbiology and Safety

Semester III
21BFDC10

Hours of instruction per week: 5
No. of credits: 3

Course Objectives:

1. Understand the role and types of microorganisms in food and environment.
2. Gain knowledge on the various types of food spoilage and prevention.
3. Provide a basic understanding of quality concepts and practice and different laws pertaining to food safety and security.

Hours

Unit I Fundamentals of Microbiology

15

Introduction, development of microbiology, different microorganisms and their morphological characteristics (Bacteria, Yeast, Mold, Virus), Benefits of Microorganisms. Contamination of food, spread of diseases through water, air and soil.

15

Unit II Food Microbiology

Milk and milk products- kinds of microorganism, source of contamination, tests to determine microbial quality and techniques of pasteurization

Cereal and cereal products – microorganisms associated with the spoilage of cereals, control of microorganism in bread and cereal products

Fruits and vegetables –contamination, spoilage, control of microorganisms and preservation of fruits and vegetables.

Meat, poultry, fish and eggs-contamination, spoilage and control of microorganism.

Related Experience: Identification of spoilage of bread, milk vegetables, fruits and meat, poultry, fish and eggs.

Unit III Food safety

15

Definition, types of hazard-physical, chemical and biological, factors affecting food safety. Safety in food procurement, hygienic practices in handling and serving foods. Standard Operation Procedure (SOP). Major quality control functions.

Unit IV Control of microorganisms

15

Contamination and sanitary quality of water, Testing the quality of water and purification of water. Role of sterilization and disinfection to control microorganisms. Air microbiology – contamination and control measures.

Related Experience: Identification of bacteria in water and food.

Unit V Food laws and standards

15

Food Safety and Standard Authority of India (FSSAI) regulations for various foods. HACCP.

Total Hours 75

Text Books:

1. Frazier WC, Westhoff DC, Vanitha, N.M. (2017). Food Microbiology. 5th ed. McGraw Hill Education.
2. Pelczar MJ, Chan ECS, Krieg N. (1993) Microbiology. 5th ed. Tata McGraw-Hill Publishing Co. Ltd.

Reference Books:

1. Ananthanarayan, R., Paniker, C.K.J., Kanungo, R. and Saxena, S. (2022). Textbook of Microbiology", Universities Press (India) Pvt. Ltd.
2. Jeffery C. Pommerville (2017), Fundamentals of Microbiology, Eleventh edition V P. Executive Publishers.
3. Martin R. Adams, Maurice O Moss, Peter (2016). Food Microbiology, Fourth edition, Royal society of chemistry.
4. Bibek Ray, Arun Bhunia (2014), Fundamentals of food microbiology, Fifth edition Taylor & Francis group, LLC,

Websites:

1. <https://www.fssai.gov.in/>
2. <https://www.fda.gov/food/guidance-regulation-food-and-dietary-supplements>
3. <https://www.ifsh.iit.edu>
4. <https://www.foodsafety.gov>
5. <https://www.icmsf.org>

Course Outcomes:

1. Acquire the knowledge on the basic concepts of microbes in food and human welfare.
2. Relate theoretical knowledge with microbes in the environment.
3. Comprehend the knowledge gained on the characteristics of the microorganism in food and apply the techniques to control microbes.
4. Understand the relevance of microbial spoilage of various foods and its toxic effects.
5. Suggest frame work on the concepts of Quality Control Activities.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	L	L	L	L	H	M	M	L	L	H	H	L	L
CO 2	M	-	M	M	L	H	M	M	L	L	H	M	ML	L
CO 3	H	L	M	M	H	M	M	H	M	H	M	M	M	M
CO 4	H	L	H	M	M	H	M	M	L	H	H	H	M	M
CO 5	H	-	H	M	M	M	H	L	H	M	-	M	H	H

Meal Management Practical

Semester III
21BFDC11

Hours of instruction per week: 3
No. of Credits: 2

Course Objectives:

1. Plan and prepare a balanced diet for various age groups considering the Recommended Dietary Allowances and dietary guidelines.
2. Calculate the nutrient content of the diets.
3. Give justification for choice of food and method of cooking adopted.

Hours

Unit I Diet for an adult man and woman.

15

Planning, preparation and calculation of nutrient content of meals for high, middle and low income families and diet for an adult man and woman doing different physical activities - sedentary, moderate, heavy.

Unit II Diet for pregnant and lactating women.

9

Planning, preparation and calculation of nutrient content of a balanced diet for a pregnant and lactating woman with modification of normal meal pattern including special foods given during lactation.

Unit III Diet for an infant and preschool child.

6

Preparation of supplementary foods, planning and preparation and calculation of nutrient content of diet for a pre- school child.

Unit IV Diet for a school going child and adolescents.

9

Planning, preparation and calculation of nutrient content of meals/ packed lunch for school age, planning and preparation of meals for adolescent's boys and girls.

Unit V Diet for the elderly

6

Planning, preparation and calculation of nutrient content of diet for the elderly considering their special needs.

Total Hours 45

Text Books:

1. **National Institute of Nutrition (2011).** Dietary guidelines for Indians- A manual Second Edition, Hyderabad.
2. **Drummond, K.E. and Brefere, L.M (2004).** Nutrition for food service and Culinary Professionals. John Wiley and Sons, New York.
3. **Robinson, B.W. Williams, S.R (2000).** Nutrition Through Life Cycle. McGraw Hill Higher Education, New York.

Reference Books:

1. **National Institute of Nutrition, Hyderabad. (2010).** Nutrient requirements and recommended dietary allowances for Indians.
2. **Joshi, S. A (2007).** Nutrition and Dietetics. Tata McGraw-Hill publishing Company Ltd, New Delhi.
3. **Mahan, L.K. and Stump, S.E (2004).** Krause's Food, Nutrition and Diet Therapy. W.B. Saunders Co.

Course Outcomes:

1. Plan a balanced diet for various age groups.
2. Prepare and serve a balanced diet.
3. Calculate the nutrients contributed by a diet or meal.
4. Justify the choice of food and method of cooking.
5. Suggest dietary guidelines for different age groups.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	H	H	H	M	M	M	L	H	H	H	M	M
CO 2	H	H	H	H	H	M	L	M	L	H	H	H	M	M
CO 3	H	H	M	H	M	M	M	H	L	M	H	H	H	M
CO 4	H	M	H	H	L	M	M	H	M	M	H	H	H	M
CO 5	H	H	H	H	H	M	M	M	M	H	H	H	M	M

DSE III - Computer Applications in Food Service

(For B.Sc. Food Service Management and Dietetics students admitted from 2021-2022 onwards)

Semester III
21BFDI04

Hours of instruction per week: 2+3
No. of credits: 4

Course Objectives:

1. Understand the basics of computer applications in food service operations.
2. Acquire knowledge on application of computers in catering establishments.
3. Use computers in different departmental activities.

Content	Hours
Unit I Basic Applications of Computer	11
Classifications of computers, components of computer system, Input /output devices, computer memory, concepts of hardware and software.	
Unit II Word Processing	12
Word processing basic, text, table and graph creation and manipulation. Formatting the text and table, handling multiple documents, Project documentation	
Unit III Spreadsheet	20
Creation and manipulation of cells, spreadsheets for small accountings billing, calculation of food cost, nutritive value, inventory of storage unit, linen room.	
Maintaining invoices / budgets, maintaining daily and monthly sales, reports, income and expenditure account.	
Unit IV PowerPoint presentations	12
Creation of presentation, preparation of slides, providing aesthetics, slide manipulation and slideshow, animations, presentation of the slides, basics of multimedia for menu card and display of menu.	
Unit V Computer Communication and Internet	20
Basic of computer networks, LAN, WAN and internet, WWW and web-sites, electronic mails Related experiences: Software packages – Food service, maintaining customer database, reservations, sales promotion through internet	
Total Hours	75

Text Books:

1. **Sethi, M and Mahan, S.M (2007).** Catering Management – An Integrated Approach. Wiley Eastern, Limited, Mumbai.
2. **Nagpal, D.P (2000).** Mastering Microsoft Office. A.H. Wheeler Publishing Co. Limited.

Reference Books:

1. **Balagurusamy, E (2009).** Computer fundamentals and C programming. Tata McGraw Hill publishing, New Delhi.
2. **Singh P.K (2008).** Basics of computers. V.K. Enterprises publishing limited, New Delhi.

Websites:

1. <https://www.fda.gov>
2. <https://journals.sagepub.com>
3. <https://www.fda.gov>
4. <https://iasri.icar.gov.in>
5. <https://www.mofpi.gov.in>

Course Outcomes:

1. Comprehend the use of computers and the recent application tools.
2. Acquire skills in documentation of the reports.
3. Demonstrate spreadsheets in pictorial presentations and mathematical formulas.
4. Create presentations, animations and graphical effects.
5. Network different departments in food service operations.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	L	L	M	L	H	M	M	-	H	H	H	M	L
CO 2	M	L	H	M	M	H	M	M	-	H	M	M	M	L
CO 3	H	L	H	M	H	M	M	H	M	H	M	M	M	M
CO 4	H	M	H	H	M	M	M	L	L	H	H	H	M	M
CO 5	H	-	H	M	H	M	H	L	H	M	-	M	H	H

Diet Therapy

Semester IV

21BFDC12

Course Objectives:

1. Understand the role of a dietitian.
2. Gain knowledge on the principles of diet therapy and different therapeutic diets.
3. Develop skill to plan and prepare therapeutic diets.

Hours of instruction per week: 5

No. of credits: 3

	Hours
Unit I Concept of Diet Therapy, Parenteral & Enteral nutrition	18
Role and responsibilities of dietitian, therapeutic adoption of normal diet, assessment of patient's needs, principles and classification of therapeutic diet, routine hospital diet, soft diet, clear liquid, full fluid diet, parenteral and enteral nutrition. Role of nutraceuticals in dietary management of diseases.	
Unit II Febrile conditions, obesity and overweight	15
Etiology and dietary management in acute, chronic and recurrent fevers. Etiology, classification and dietary management of obesity, underweight.	
Unit III GI tract, liver diseases and diet in diabetes mellitus	16
Etiology, symptoms, biomarkers and dietary management in gastritis, peptic ulcer, diarrhea, constipation, liver diseases and diabetes mellitus.	
Unit IV Cardiovascular and renal diseases	13
Causes, types, symptoms, biomarkers and dietary management of Cardiovascular-hypertension, hyperlipidemia, atherosclerosis and renal diseases- acute, chronic, glomerulonephritis, nephrosis, nephritic syndrome, nephrolithiasis, renal failure and dialysis	
Unit V Allergic condition, Cancer and Gout	13
Causes, types, symptoms biomarkers and dietary management of food allergy, cancer and gout	
Total Hours	75

Text Books:

1. **Metta J.S. (2014).** Basic Nutrition Management. Aavishkar publishers Mumbai.
2. **Srilakshmi (2009).** Dietetics. New Age International Private Limited.
3. **James, W.P.T. and Ralph, A (2000).** Human Nutrition and Dietetics. Churchill Livingston.

Reference Books:

1. **AirCmde.L.K. Sharma (2012)**, Nutrition Dietician and Health Management, 1st edition, Published by Surendra Publications.
2. **Mahan, L.K. and Stump, S.E (2004)**. Krause's Food, Nutrition and Diet Therapy. Eleventh Edition. W.B. Saunders Co.
3. **Lori A. Smolin (2002)**. Nutrition Science and Applications. Third edition. Saunders College publisher. New Delhi

Websites:

1. <https://www.fda.gov>
2. <https://journals.sagepub.com>
3. www.ida.com
4. <https://lod.nal.usda.gov>
5. <https://www.nutrition.gov>

Course Outcomes:

1. Relate the causes, symptoms and onset of various types of diseases.
2. Comprehend dietary principles in planning therapeutic diets for disease conditions.
3. Acquire professional diet counseling skills.
4. Manage a dietary department at the capacity of a dietitian.
5. Become a healthcare professional.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	H	M	H	M	L	H	H	H	M	-
CO 2	M	M	H	H	M	M	H	H	H	M	H	H	M	M
CO 3	M	H	M	M	M	M	M	L	L	M	M	M	M	M
CO 4	H	M	M	M	M	M	M	H	M	H	H	H	H	M
CO 5	H	M	M	M	H	H	M	H	M	H	M	M	M	M

Bakery and Confectionery

Semester IV

Hours of instruction per week: 3

21BFDC13

No. of credits: 3

Course Objectives:

1. Get an insight into the planning of bakery units.
2. Understand the role of different ingredients and principles in baking.
3. Acquire skills involved in baking and confectionery.

Content	Hours
Unit I Introduction to Bakery and Confectionery	8
Definition, principles of baking. Scope of bakery industry, planning and organization of bakery unit, minor and major equipment required, bakery sanitation and personal hygiene.	
Unit II Ingredients in bakery and confectionery	10
Wheat, milling of wheat, by products of milling of wheat, diastatic activity and role of gluten in baking. Types and role of leavening agents, shortening agents, sugar, milk and milk products, flavoring and coloring agents, off flavor and its prevention. Nuts, spices and condiments, setting material, preserved and candied fruit peels.	
Unit III Baked products	12
Bread - preparation, types, faults and its prevention. Preparation of buns, rolls, soup sticks, rusk and pizza base. Cakes-Types, methods of preparation, faults and its prevention. Method of preparing biscuits, cookies, puff, pastry, muffins, pies and macaroons. Types of icing.	
Unit IV Confectionery	10
Preparation of fudge, fondants, toffees, panna cotta, pudding, chocolates and jellies	
Unit V Marketing of Baked Products	
Marketing and sales promotion- costing, packaging and labeling.	5
Total Hours	45

Text Books:

1. **Yogambal Ashokkumar (2012).** Bakery and Confectionary, PHI publication.
2. **Uttam K Singh (2011).** Theory of Bakery and Confectionary An operational approach. Kanishka Publishers and Distributors, New Delhi.
3. **John Kingslee (2006).** A professional text book to Bakery and Confectionary. New Age International Pvt Limited Publisher, New Delhi.

Reference Books:

1. **Dubey. S.C (2002).** Basic Baking. Published by the society of Indian Bakers, New Delhi.
2. **Emil Braun (2000),** Bakers Hand Book on Practical Baking Published by U.S. Wheat Associates, New Delhi.
3. **Nicolello, I. and Foote, R (2000).** Complete Confectionary Techniques. Hodder and Solution, London.

Websites:

1. <https://www.nqr.gov.in>
2. <https://www.mofpi.gov.in>
3. <https://nios.ac.in>

Course Outcomes:

1. Understand the principles of baking and confectionery.
2. Acquire knowledge on the role of various ingredients used in baking and confectionery.
3. Use combination of foods in the development of baked products
4. Identify and control faults in baking.
5. Establish a bakery unit.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	-	M	L	H	H	H	H	M	H	H	M	M	H
CO 2	M	L	H	L	H	H	H	H	H	H	H	M	M	H
CO 3	M	L	H	L	H	H	H	H	H	H	H	M	M	H
CO 4	L	-	M	L	H	H	L	L	L	M	H	H	M	H
CO 5	H	-	H	-	H	H	H	H	H	H	H	M	M	H

Diet Therapy Practical

Semester IV

21BFDC14

Hours of instruction per week: 4

No. of credits: 2

Course Objectives:

1. Understand the dietary principles to plan therapeutic diets for disease conditions.
2. Plan and calculate the nutrient content of the diets prepared.
3. Acquire skill in diet counseling.

	Hours
Unit I Routine Hospital diets, soft and liquid diet	12
Normal diet, hospital diet- clear fluid, full fluid and soft diet, pre and post operative diets.	
Unit II Febrile conditions, High and low-calorie diets	12
Diet in typhoid, malaria, tuberculosis, obesity and underweight.	
Unit III Gastrointestinal and liver disorders	12
Diet in diarrhea, constipation, peptic ulcer, gastritis, hepatitis, cirrhosis, gallstones and pancreatitis.	
Unit IV Cardiovascular diseases and diabetes mellitus	12
Mild, moderate and severe sodium restricted diet, diet in atherosclerosis, diabetes mellitus -type I, type II and gestational diabetes mellitus.	
Unit V Renal diseases	12
Diet in nephritis, nephrosis, nephrolithiasis, acute and chronic renal failure.	
Diet in allergy, cancer and gout. Demonstrate the available software related dietary management of diseases.	
Total Hours	60

Text Books:

1. **Metta J.S. (2014).** Basic Nutrition Management. Aavishkar publishers. Mumbai
2. **Mahan, L. K., Escott-Stump, S., Raymond, J. L., & Krause, M. V. (2012).** Krause's food & nutrition therapy. Elsevier/Saunders.
3. **Srilakshmi (2009).** Dietetics. New Age International Private Limited.
4. **James, W.P.T. and Ralph, A (2000).** Human Nutrition and Dietetics. Churchill Livingston.

Reference Books:

1. **Air Cmde. L.K. Sharma (2012)**, Nutrition Dietician and Health Management, 1st edition. Published by Surendra publications.
2. **Mahan, L.K. and Stump, S.E (2004)**. Krause's Food, Nutrition and Diet Therapy. Eleventh Edition. W.B. Saunders Co.
3. **Lori A Smolin (2002)**. Nutrition Science and Applications. Third edition. Saunders College publisher. New Delhi.

Websites:

1. <https://www.nqr.gov.in>
2. <https://www.mofpi.gov.in>
3. <https://nios.ac.in>

Course Outcomes:

1. Relate the causes, symptoms and onset of various types of diseases.
2. Apply dietary principles to plan therapeutic diets for diseases conditions
3. Demonstrate skills in preparing appropriate therapeutic diets and calculate the nutrient content of diets prepared.
4. Counsel and recommend personalized diets for various disease condition
5. Become a healthcare professional.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	H	M	H	M	L	H	H	H	M	M
CO 2	M	M	H	H	M	M	H	H	H	M	H	H	M	M
CO 3	M	H	M	M	M	M	M	L	L	M	M	M	M	M
CO 4	H	M	M	M	M	M	M	H	M	H	H	H	H	M
CO 5	H	M	M	M	H	H	M	H	M	H	M	M	M	M

Bakery and Confectionery Practical

Semester IV

21BFDC15

Hours of instruction per week: 4

No. of credits: 2

Course Objectives:

1. Select appropriate ingredients in baking.
2. Acquire skills in the preparation of bakery products
3. Comprehend the principles and apply skills involved in baking and confectionery

Hours

Unit I Cereal flour analysis

12

Microscopic examination of wheat flour and other flours, Preparation of gluten from various cereal flours and examining the qualities, determination of water absorption and dough raising capacity.

Unit II Cakes

12

Preparation of sponge cake, carrot cake, chocolate cake, plum cake, cupcake, oil-based cake, chocolate chips, mini muffins and brownie

Unit III Biscuits and pies

12

Preparation of salt biscuits, sweet biscuits, masala biscuits, chili biscuits, chocolate biscuits, apple pie, pot pie and fruit tarts

Unit IV Confectionery

12

Preparation of fudge, fondant, toffees, pudding, jellies, panna cotta and chocolate mousse

Unit V Homemade chocolates

12

Preparation of plain chocolate, white chocolate, dry fruits chocolate, oats chocolate, coconut chocolate truffle, peanut butter chocolate and chocolate cups

Total Hours 60

Text Books:

1. **Yogambal Ashokkumar (2012).** Bakery and Confectionary, PHI publication.
2. **Uttam K Singh (2011).** Theory of Bakery and Confectionary An operational approach. Kanishka Publishers and Distributors, New Delhi.
3. **John Kingslee (2006).** A professional text book to Bakery and Confectionery. New Age International Pvt Limited Publisher, New Delhi.

Reference Books:

1. **Dubey. S.C (2002).** Basic Baking. Published by the society of Indian Bakers, New Delhi.
2. **Nicolello, I. and Foote, R (2000).** Complete Confectionary Techniques. Hodder and Solution, London,
3. **Bakers Hand Book on Practical Baking (2000).** Published by U.S. Wheat Associates, New Delhi.

Websites:

1. <https://www.nqr.gov.in>
2. <https://www.mofpi.gov.in>
3. <https://nios.ac.in>

Course Outcomes:

1. Demonstrate skills in determining the qualities of flour.
2. Develop skills in different methods of dough and batter making
3. Evaluate various methods of baking.
4. Make use of ingredients in baking.
5. Design common bakery and confectionery recipes.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	L	H	L	M	H	H	H	M	L	H	M	M	H
CO 2	M	L	M	L	H	H	H	H	H	M	H	M	M	H
CO 3	M	L	H	M	M	H	H	H	H	H	H	M	M	H
CO 4	M	L	H	L	M	H	H	H	H	H	H	M	M	H
CO 5	H	L	H	M	M	H	M	H	H	H	H	M	M	H

Nutritional Biochemistry

Semester V

Hours of instruction per week: 4

21BFDC16

No. of credits: 3

Course Objectives:

1. Acquire knowledge on basic concepts of biochemical reactions.
2. Understand the biochemical reactions involved in the metabolism of various nutrients in the body.
3. Comprehend the mode of action of different hormones.

Content	Hours
Unit I Introduction to Biochemistry Definition of biochemistry, molecular terms in biochemistry, Knowledge of biochemistry. Biomolecules – Structure and major biomolecules. Enzymes - properties, classification and its functions. Molecular aspects of transport- passive diffusion, active transport, bioenergetics- role of ATP, biological oxidation, Electronic transport mechanism.	12
Unit II Carbohydrate metabolism Biomedical importance, glucose transport, glycolysis, metabolism of lactate and pyruvate, citric acid cycle, gluconeogenesis, glycogenesis, glycogenolysis, pentose phosphate pathway, release of energy during glucose oxidation in cells, oxidative phosphorylation	11
Unit III Lipid metabolism Biomedical importance, intestinal resynthesize, transport, biosynthesis of fatty acids, mobilization, storage and metabolism of fat, beta oxidation of fatty acids, ketogenesis, ketosis, metabolism of phospholipids, glycolipids and cholesterol.	14
Unit IV Protein metabolism Biomedical importance, protein transport, transamination, deamination – fate of amino and keto groups, biochemical transformations, genetic repair mechanisms, genetic code – protein biosynthesis.	15
Unit V Hormones Pituitary, adrenocorticoid, thyroxine, insulin, glucagon, reproductive hormones, Mode of action, control of homeostasis	8
Total Hours	60

Text Books:

1. **Ambika Shanmugam (2016).** Fundamentals of biochemistry for medical student., Wolters publication, Eighth edition
2. **Lehninger. Michael M. Cox, David L. Nelson (2008).** Principles of Biochemistry. 5th edition. W.H. Freeman and Company, New York, Edition.
3. **Rodney Boyer (2006).** Concepts in Biochemistry. 3rd edition. John Wiley and Sons (Asia) Pvt. Ltd.

Reference Books:

1. **Jeremy N. Berg, John L. Tymoczko, and Linbert Stryer (2007).** Biochemistry. 6th edition. W.H. Freeman and Company.
2. **Robert K. Alurray, Daryl K. Granner and Victor W. Rodwell (2007).** Harper's Illustrated Biochemistry. 27th edition. McGraw-Hill Companies, Inc.
3. **Thomas M. Devin (2006).** Textbook of Biochemistry with Clinical Correlations. 6th edition. Wiley-Liss, Hocke, NJ.

Websites:

1. <https://www.qmul.ac.uk>
2. <https://www.csun.edu>
3. <https://www.nin.res.in>
4. <https://ncdc.gov.in>

Course Outcomes:

1. Understand the basic concepts of biochemistry
2. Gain knowledge on metabolism of carbohydrate protein and lipids
3. Acquire knowledge on functions and mode of action of different hormones.
4. Relate metabolism of different nutrients with dietary intake.
5. Suggest preventive measures to overcome metabolic abnormalities.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	L	L	L	L	L	M	M	L	L	L	H	L	L
CO 2	M	H	M	M	L	L	M	M	-	L	L	M	M	L
CO 3	M	M	M	M	M	L	M	M	L	L	L	M	M	L
CO 4	H	H	H	H	H	M	M	M	M	H	M	H	H	H
CO 5	H	L	H	H	M	M	H	M	H	M	L	L	H	H

Human Resource Management

Semester V
21BFDC17

Hours of instructions per week: 5
No. of credits: 3

Course Objectives:

1. Understand the importance of human resources in food service
2. Gain knowledge on the management of human resources.
3. Comprehend the welfare measures and laws pertaining to human resources.

Hours

Unit I Introduction to Personnel Management

10

Nature, scope, objectives, role and functions of personnel management. Planning of human resources. Professional ethics in work areas.

Unit II Training methods and Motivation

20

Methods of training – Internal and external methods, merits and demerits

Motivation- Human needs, methods and theories of motivation,

Related experience: Case studies in training and motivation

Unit III Performance Appraisal

25

Performance appraisal methods- merits and demerits, promotion, demotion, transfer, separation and retirement. Grievances and grievances handling.

Unit IV Human Relations

10

Importance of human relations, human needs. Communication- types, importance and barriers. Leadership- types, styles, skills and qualities of a leader.

Related Experience: Study the types of motivation and communication followed in an organization

Unit V Employee Welfare and Benefits

10

Fixation of wages and wage policy. Welfare measures at the workplace. Labor laws – Catering Establishment Act, Shop and Establishment Act, Factories Act, Minimum Wages Act, Industrial Disputes Act.

Total Hours 75

Text Books:

1. **Sethi, M and Mahan, S.M (2007).** Catering Management – An Integrated Approach. Wiley Eastern, Limited, Mumbai.
2. **Tripathi, P.C (2003).** Personnel Management – Industrial Relation. Sultan Chand and Sons, New Delhi.
3. **Mamoria, C.B (2000).** Personnel Management. Himalaya Publishing House, Mumbai.

Reference Books:

1. **Sharma, A.M (2003).** Personnel and Human Resource Management. Himalaya Publishing House, Mumbai.
2. **Rao, V.S. P (2002).** Human Resource Management Text and cases. Excel books.
3. **Rudrabasavaraj, M. N (2001).** Dynamic Personnel Administration Management of Human Resources, Himalaya Publishing House, Mumbai.

Websites:

1. <https://www.shrm.org>
2. <https://services.india.gov.in>
3. <https://www.tn.gov.in>
4. <http://education.gov.in>
5. <http://www.mcrhrdi.gov.in>

Course Outcomes:

1. Relate the human resource and managerial functions.
2. Plan effective managerial techniques.
3. Apply knowledge for manpower planning and selection process
4. Compile effective employee monetary and non-monetary benefits
5. Outline professional ethics for employees.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	L	H	-	L	M	L	M	M	H	H	M	M	H
CO 2	M	M	H	-	L	L	L	M	M	H	H	H	M	H
CO 3	M	M	H	-	L	L	L	M	M	H	H	H	M	H
CO 4	M	L	L	L	L	L	M	M	M	H	H	H	M	H
CO 5	M	L	H	-	L	L	L	M	M	H	H	H	M	H

Food and Beverage Service

Semester V

21BFDC18

Hours of instruction per week: 5

No. of credits: 3

Course Objectives:

1. Understand the knowledge and functions of food and beverage department
2. Demonstrate skills in food and beverage management.
3. Plan menus for various events and food service operations.

Content	Hours
Unit I Food and Beverage Department	12
Types of food and beverage operations, factors affecting food and beverage service methods, organization, duties and responsibilities of food and beverage staff, skills and attitudes and professional ethics of food and beverage staff.	
Unit II Table Setting Procedures	18
Furniture - description and use, Linen- types, tablecloth and napkins, glassware, tableware and hollow- ware description and use, special accessories at the table, trolleys and sideboard description and use. Related experience: Description and use of glassware, chinaware and hollow ware	
Unit III Menu and Service	15
Definition, classification, French classical menu, continental, breakfast menu, brunch and high tea, compiling a menu and menu writing, cover laying and service for the types of menu. Related experience: Compiling different types of menu, cover laying for menus, various types of napkin folding.	
Unit IV Beverages	16
Juices – Fresh and fermented, non-alcoholic beverages – types and preparation, mock tails. Related experience: Service common beverages	
Unit V Food and Beverage Areas and Function Catering	14
Still room and wash up areas, hot plate and silver room – functions and staff, seating arrangements, staff responsibilities and service for banquets, buffets and weddings. Related experience: Event and outdoor catering plans.	
Total Hours	75

Text Books:

1. Singaravelan.R. (2013). Food and Beverage service. Oxford university Press. New Delhi.
2. Ravi Agarwal (2010). Essential of Food and Beverage Service. Subline publication, New Delhi
3. Sudhir Andrews (2008). Text book of Food and Beverage Management, McGraw Hill Company Ltd., New Delhi.

Reference Books:

1. **JagmohanNegi (2013).** Food And Beverage Service. S. Chand and Company. Bangalore.
2. **Dawan, V (2000).** Food and Beverage Service. Frank Bros. & Co. Pub Ltd., New Delhi.
3. **Lillicrap, D. R and Cousin, J. A (1990).** Food and Beverage Service. Hodder and Stoughton, London.

Websites:

1. <https://www.mofpi.gov.in>
2. <https://www.fssai.gov.in>
3. <https://www.epa.gov.in>
4. <https://www.ncs.gov.in>
5. <https://nqr.gov.in>

Course Outcomes:

1. Outline the functions of the food and beverage department.
2. Comprehend the various types of menu and appropriate cover
3. Acquire skills in cover laying.
4. Demonstrate food service etiquettes and skills while serving a guest/customer.
5. Manage a restaurant service and events

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	-	M	-	-	M	H	M	L	M	M	M	M	M
CO 2	M	-	H	-	-	M	H	H	H	M	H	M	M	M
CO 3	M	-	M	-	-	M	M	L	L	M	M	M	M	M
CO 4	H	-	M	-	-	M	M	H	M	H	H	M	M	M
CO 5	H	-	M	-	-	H	M	H	M	H	M	M	M	M

Paediatric Dietetics

Semester V

21BFDC19

Hours of Instruction per week: 3

No. of credits: 3

Course Objectives:

1. Learn the pattern of growth and development during childhood.
2. Understand the nutritional needs of children.
3. Gain knowledge on the principles of diet therapy for childhood diseases.

Hours

Unit I Fetal Development and Growth of Infants

9

Maternal reproductive health, conception and formation of fetus, stages of fetal growth, role of placenta and hormones, physiological development of neonates and infants. Nutritional requirements of infants, preschoolers, school age

Unit II Diet in Low Birth Weight Infants and Nutritional Disorders

9

Parenteral feeding, transition from parenteral to enteral feeding, feeding formula and feeding methods, Diet in common communicable diseases. PEM, vitamin A deficiency, anemia, dental caries.

Unit III Diet in Endocrine and Gastrointestinal Disorders and Food Allergies

9

Childhood obesity- etiology, risk, dietary interventions and weight management. Type I diabetes- etiology, insulin therapy and nutritional management. Causes, dietary management in diarrhea and constipation and ORT. Food allergens, sensitivity to breast milk and elimination diets.

Unit IV Diet in Inborn Errors of Metabolism, Cancer and HIV

8

Lactose intolerance-causes, symptoms and diet management, milk substitutes, inborn errors of protein, carbohydrate and fat metabolism-causes, symptoms and dietary management. Diet in degenerative diseases - congenital heart disease, types of cancers, dietary recommendations and preventing malnutrition, HIV transmission to children, symptoms, care of HIV infected children and dietary intervention. Cost of childhood morbidity and mortality.

Unit V Child Feeding Psychology

10

Introduction to child psychology, importance of child psychology, feeding problems, psychological guidance, counseling parents for feeding strategies.

Total Hours

45

Text Books:

1. **Lanigan J, Singhan A. (2009)** Early Nutrition and Long-Term Health: a Practical approach. Proceeding of the Nutrition Society.
2. **Robinson C.R. and Lawler. M (2004).** Normal and Therapeutic Nutrition. Macmillan Publishers and Co., New York.
3. **Antia F.P (1997).** Clinical Dietetics and Nutrition. Oxford University Press, New Delhi.

Reference Books:

1. **Joshi. S. A (2010).** Nutrition and Dietetics Third edition.
2. **Mahan K and Stump S.E (2008).** Krause's Food and Nutrition Therapy. Eleventh edition, Saunders Publishing Company.
2. **ICMR (2008).** Nutrient Requirements and Recommended Dietary Allowances for Indians, New Delhi.

Websites:

1. <https://www.nutrition.gov>
2. <https://www.nal.usda.gov>
3. <https://www.ncbi.nlm.nih.gov>
4. <https://wcd.nic.in>
5. <https://nhm.gov.in>

Course Outcomes:

1. Comprehend the importance and principles of dietetics for infants and children.
2. Plan suitable diets for nutritional disorders.
3. Apply diet therapy for diabetes and congenital heart diseases.
4. Evaluate feeding problems and counsel.
5. Create new feeds for children.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	H	M	H	H	M	M	M	M	M	M	H	H	M
CO 2	H	H	H	H	H	M	L	M	L	M	M	H	H	M
CO 3	M	M	M	M	M	L	M	M	H	M	M	M	M	L
CO 4	H	M	M	H	M	M	M	M	H	M	M	H	M	L
CO 5	M	M	H	H	H	M	M	M	L	L	M	M	M	H

Nutritional Biochemistry Practical

Semester V

21BFDC20

Hours of instruction per week: 3

No. of credits: 2

Course Objectives:

1. Learn the collection of blood and urine samples for analysis.
2. Develop skill in handling analytical equipment.
3. Understand standard procedures for analyzing urine and blood samples.

	Content	Hours
Unit I	Qualitative analysis of sugars in urine	6
Unit II	Qualitative analysis of urea, creatinine and nitrogen in urine samples.	12
Unit III	Methods of collection of blood. Separation of serum and plasma, Quantitative estimation of blood for glucose	9
Unit IV	Quantitative estimation of blood cholesterol	6
Unit V	Quantitative estimation of urea, creatinine and protein in blood	12
Total Hours		45

Text Books:

1. **Ochei and Kolhatkar. (2008).** Medical laboratory science theory and practice, Fourth Edition, Tata MC Graw Hill publication.
2. **Ramakrishnan S, Sulochana K.N, Shankara S, M.K Ganesh, A Hemavathi (2008).** Laboratory
3. **Manual for practical Biochemistry, JAYPEE publisher, 1st Edition.**
4. **Ramnik Sood (2006).** Textbook of medical Laboratory technology, JAYPEE publisher.

Reference Books:

1. **Jeremy N. Berg, John L. Tymoczko, and LnbertStryer (2007).** Biochemistry. 6th edition, W.H. Freeman and Company.
2. **Robert K. Alurray, Daryl K. Granner and Victor W. Rodwell (2007).** Harper's Illustrated Biochemistry. 27th edition. McGraw-Hill Companies, Inc.
3. **Thomas M. Devin (2006).** Textbook of Biochemistry with Clinical Correlations.6th edition. Miley-Liss, Hocke, NJ.

Websites:

1. www.aoac.org.in
2. <https://www.csun.edu>
3. <https://www.nin.res.in>
4. [4.https://ncdc.gov.in](https://ncdc.gov.in)

Course Outcomes:

1. Skill in collection of blood and urine samples for analysis.
2. Competent in handling analytical equipment.
3. Choose appropriate analytical procedures
4. Perform quantitative and qualitative analysis of urine and blood samples.
5. Examine and interpret analytical results.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	-	M	-	-	-	L	M	H	L	L	L	L	L	M
CO 2	-	H	M	-	L	M	M	M	-	L	L	M	L	H
CO 3	L	H	M	L	M	H	M	H	-	L	-	M	M	H
CO 4	L	H	-	L	L	M	M	H	L	M	-	M	M	M
CO 5	M	H	M	H	H	H	M	H	M	M	M	M	H	H

Paediatric Dietetics Practical

Semester V

Hours of instruction per week: 3

21BFDC21

No. of credits: 2

Course Objectives:

1. Relate dietary principles with nutritional requirements for children.
2. Prepare weaning foods suitable for children.
3. Plan diet for common diseases for the prevention of childhood diseases.

	Hours
Unit I Weaning and feeding formulae	7
Plan diets for different types of weaning foods –Liquid foods, Semi-solid foods, Solid foods, Low cost nutritious supplementary foods. Demonstration of feeding techniques adopted for normal and special children.	
Unit II Febrile condition	10
Planning and preparation of diets for children suffering from febrile conditions, common cold and chicken pox/ measles/mumps, and polio.	
Unit III Gastrointestinal disorders	8
Diet for Gastrointestinal Diseases-diarrhea, vomiting & constipation and fluid diets.	
Unit IV Nutritional disorders	10
Diets for childhood obesity, (Type 1 diabetes), children suffering from PEM, vitamin A deficiency, anemia and dental caries	
Unit V Inborn errors	10
Diets for children suffering from lactose intolerance, inborn errors of metabolism – phenylketonuria, autism, schizophrenia, galactosemia, cancer & HIV infected children. Hospital visit to observe the preparation and administration of feeding modalities	
Total Hours	45

Text Books:

1. **Lanigan J, Singhal A. (2009)**, Early nutrition and long-term health: a practical approach. Proceedings of the Nutrition Society
2. **Vanessa. S (2008)**, Clinical Pediatric Dietetics.
3. **Antia F.P (1997)**. Clinical Dietetics and Nutrition. Oxford University Press, New Delhi.

Reference Books:

1. **ICMR (2010)**, Nutrient Requirements and Recommended Dietary Allowances for Indians, New Delhi.
2. **Mahank and Stump S.E (2008)**. Krause's Food and Nutrition Therapy. Eleventh edition. Saunders Publishing Company.
3. **IAP Textbook of Pediatrics**, 7th edition.

Websites:

1. <https://www.nutrition.gov>
2. <https://www.nal.usda.gov>
3. <https://www.ncbi.nlm.nih.gov>
4. <https://wcd.nic.in>
5. <https://nhm.gov.in>

Course Outcomes:

1. Acquire skill in preparing the various types of weaning foods.
2. Analyze the common diseases of children and plan appropriate menus.
3. Exhibit skills in planning diet for special conditions
4. Suggest suitable diets for nutritional disorders
5. Prepare, administer and practice feeding techniques

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	H	H	H	M	M	M	L	M	H	M	M	L
CO 2	H	H	H	M	H	L	M	M	L	M	M	M	M	L
CO 3	H	H	H	M	H	L	M	M	M	L	M	H	M	L
CO 4	H	M	M	M	H	L	L	M	L	M	M	M	M	L
CO 5	M	M	M	M	H	L	L	M	L	M	M	M	M	M

Registered Dietitian Course (Self Study)

Semester V
21BFDC22

Hours of Instruction per week: 1
No. of credits: 4

Course Objectives:

1. Know scope of Registered Dietitian.
2. Gain knowledge to become a Registered Dietitian.
3. Acquire aptitude skills to appear for the Examination.

Hours

Unit I National and International Dietetic forum

3

Genesis, objectives and functions.

Unit II Registered Dietitians

3

Introduction, Eligibility Requirements to become a Registered Dietitian. Hospitals for R.D training in India.

Unit III Review of Questions –I

3

Outline of syllabus and examination pattern. Components of RD training, Review of Questions –I, Practice sessions for Questions, Human Physiology, Biochemistry, Physiologic and Metabolic Changes in Disease, Food Microbiology, Sanitation and Hygiene.

Unit IV Review of Questions –II

3

Practice session for question in Human Nutrition and Meal Management, Community Nutrition, Diet Therapy (Theory), Nutrition Education and Dietetic. Counseling and Food Services Management

Unit V

3

Preparation for the RD exam.

Model Exams and Periodic test from Question bank.

Total Hours 15

Text Books:

1. Morgan, J.B., Dickerson, J.W.T (2003). Nutrition in Early Life, John Wiley and Sons Ltd.
2. Garrow, J.S., James, W.P.T. and Ralph, A (2000). Human Nutrition and Dietetics, Churchill Livingstone.
3. Sembulingam, Essentials of Medical Physiology (2000), Jaypee brothers Medical Publishers(P)Ltd, New Delhi.

Reference Books:

1. Sethi, M., Malhan, S. (2007), Catering Management, Wiley Eastern Ltd.,
2. Mahan, L.K. and Stump, S.E (2004), Krause's Food, Nutrition and Diet Therapy, 11th Edition, W.B. Saunders Co.
3. Kinton. R and Cesarani. V (2002). The Theory of Catering Edward Arnold Publishers, New York.

Websites:

1. <https://idaindia.com>
2. <https://www.bls.gov>
3. <https://nhp.gov.in>
4. <https://www.igmpiindia.org>
5. <https://www.nin.res.in>
6. <https://www.cdrnet.org>

Course Outcomes:

1. Aware of national and international dietetic organization.
2. Gain knowledge on the preparation procedures for Registered Dietitian Exam
3. Competent in answering questions relating to Human Physiology, Biochemistry, and Food Microbiology, Nutrition and Dietetics.
4. Outline the components and pattern of questions of RD examinations.
5. Apply for Registered Dietitian examination.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	L	L	L	M	M	L	M	M	L	M	M	H	M	L
CO 2	H	M	M	M	H	M	M	H	L	H	M	H	H	M
CO 3	L	L	L	M	M	L	L	M	H	M	M	H	M	M
CO 4	-	-	-	L	-	L	M	L	M	L	L	M	M	M
CO 5	H	H	M	M	M	L	M	M	H	L	L	M	L	M

Internship

Semester V
21BFDC24

No. of credits: 6

I. Catering Internship at a Star category Hotel for six weeks at the end of first year during vacation

1. Observe different departments in the hotel.
2. Prepare a lay out of the production and service department in the hotel.
3. Use different production and service equipment in hotels.
4. Study basic hotel terminologies.
5. Perform Mise-en place and Mise-en scene in the food service area.
6. Aware of guest supplies.
7. Acquire skills on bed making, napkin folds, basic kitchen production, table service and clearing up procedures.
8. Observe front office activities.
9. Planning of menu and cost calculation.
10. Learn Guest handling etiquettes.
11. Presentation of menu and food styling.
12. Maintenance of hotel internship log book.
13. Internship Report writing.
14. Listing of individuals learning outcomes from internship.

II. Dietetics Internship at a Multispecialty hospital for six weeks at the end of second year during vacation

1. Observe different sections in the dietary department.
2. Prepare a lay out of the dietary department.
3. Use different production and service equipment in hospital dietary.
4. Learn basic hospital abbreviation.
5. Take up hospital rounds with a senior dietician to assess a patient's dietary needs.
6. Read and comprehend case sheets of the patients.
7. Screening of patients for nutritional status.
8. Take the diet history of the patients.
9. Plan customized diets.
10. Calculate nutritive value of the planned diet.
11. Setting up a diet tray in the dietary department.
12. Follow up of patient's case sheet and diet history.
13. Experience in outpatient diet counseling.
14. Preparation of diet counseling materials (Charts, PowerPoint presentation, Models, Video).
15. Preparation and presentation of two case studies.
16. Maintenance of Dietary internship log book.
17. Internship Report writing.
18. Listing of individuals learning outcomes from internship.

Management of Food Service

Semester VI

21BFDC25

Hours of instruction per week: 5

No. of credits: 3

Course Objectives:

1. Gain knowledge on organization and management of food service operations.
2. Understand the marketing principles in food service.
3. Comprehend quality concepts in management and disaster management.

Hours

Unit I Organization in food service operation:

18

Definition, types of organization, organization chart, and theories, Contingency approach.

Related experience: Visit to commercial and non-commercial institutions.

Unit II Principles of management

13

Definition, evolution of management, tools, principles and functions of management.

Related experience: Practical experience in work simplification methods, time and motion study

Unit III Marketing management in food service operation

23

Definition, elements of marketing-Marketing concepts, product life cycle, sales promotion techniques, buying behavior of individuals in commercial and non-commercial institutions.

Unit IV Current concepts in quality management:

16

Total quality management, management information system, quality of work life.

Unit V Disaster Management

5

Types of disaster- flood, famine, tsunami, earthquake, decision making during calamities, Need for food- preparation, packing, transportation, distribution and storage, sanitation and hygiene in preparation and food handling, health care facilities.

Total Hours 75

Text Books:

1. Sethi, M. and Malhan, S.M (2007). Catering Management an Integrated Approach. Wiley Eastern Limited, Mumbai.
2. Mary B. Gregoire, Marian C. Spears (2007), Food Service Organizations, Pearson Prentice Hall
3. Jyoti.S, Sharma (2006), Food Service Modern Technique and Practices, Akansha Publishing House.

Reference Books:

1. **Sethi, M (2011).** Institutional Food Management. New age International (P) Limited. Second edition.
2. **Davis, B. Lockwood. A and Stone. S (2008).** Food and Beverage Management. Third Edition. Elsevier Publication.
3. **Andrews, S (2008).** Text book of Food & Beverage Management. Tata McGraw-Hill Publishing Company Limited.

Websites:

1. www.aima.in
2. www.fhrai.com
3. www.iso.org
4. <https://www.food-management.com>
5. <https://ncert.nic.in>

Course Outcomes:

1. Understand organization structures in food service institutions.
2. Comprehend the theories and principles of management.
3. Demonstrate marketing and sales promotional skills.
4. Aware of concepts of Total Quality Management.
5. Manage food requirements in a disaster.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	-	L	L	L	L	M	M	M	M	M	M	M	M
CO 2	M	-	M	-	L	L	L	L	L	L	L	M	M	L
CO 3	M	-	L	-	L	M	M	M	H	L	L	M	H	H
CO 4	H	L	H	L	L	M	H	M	M	M	M	H	H	M
CO 5	M	M	H	H	M	H	M	H	H	H	L	L	H	M

Entrepreneurship Development

Semester VI
21BFDC26

Hours of instruction per week:4
No. of credits:3

Course Objectives

1. Understand the need and scope of Entrepreneurship.
2. Foster entrepreneurial traits and techniques.
3. Gain knowledge on legal and managerial aspects to run small scale enterprises.

Hours

Unit I Introduction to Entrepreneurship Development

9

Need, scope and characteristics of entrepreneurship, types of entrepreneurs, Qualities of successful Entrepreneurs and steps in establishing Entrepreneurial systems

Unit II Project Design

12

Steps in project formulation, plant and process layout, network techniques, SWOT analysis.

Unit III Financial Issues of an Enterprise

10

Financial institutions, banking and types of banking, financial incentives and subsidies, financial ratios and their significance, bookkeeping, financial statements.

Unit IV Quality Control and Sales Management

14

Meaning and importance of quality control, quality standards, market survey techniques, pricing, packaging, advertising, and sales promotion.

Unit V Management of Small Scale Industries

15

Characteristics of small scale industries, social responsibilities and business ethics, sickness and remedial measures in small scale industries.

Total Hours 60

Text Books:

1. **Gopal. J. Kalantri (2010).** Text book of Entrepreneurship Development. Vision Publications
2. **Gupta. C. B., Srinivasan. P (2007).** Entrepreneurship Development. Sultan Chand and Sons, New Delhi.
3. **Rathore. B.S., Saini. J. S (2005).** A Handbook of Entrepreneurship. Aapga Publications, Panchkula (Haryana).

Reference Books:

1. **Kavil Ramachandran (2008).** Entrepreneurship Development. McGraw Hill Publisher.
2. **Khan, M. A (2003).** Food Service Operations. AVI Publications Co., Connecticut.
3. **Chunawalla, A (2000).** Advertising and Marketing Research. Himalaya Publishing House, Mumbai.

Websites:

1. <https://www.startupindia.gov.in/>
2. <https://www.india.gov.in/people-groups/community/entrepreneur>
3. <https://www.msde.gov.in/>
4. <https://www.msde.gov.in/>
5. <https://www.msde.gov.in/>

Course Outcomes:

1. Understand the forms and practices adopted at small scale enterprises
2. Choose resources needed for an enterprise
3. Develop competencies in financial process practiced at the organizations
4. Compile the sales management tasks at the food-based business
5. Take up Entrepreneurship ventures in food and other related areas.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	L	H	L	M	L	L	M	M	H	H	H	M	H
CO 2	M	M	H	L	M	L	L	M	M	H	H	H	M	H
CO 3	M	M	H	L	M	L	L	M	M	H	H	H	M	H
CO 4	M	L	H	L	M	L	L	M	M	H	H	H	M	H
CO 5	M	L	H	L	M	L	L	M	M	H	H	H	M	H

Quantity Food Production

Semester VI
21BFDC27

Hours of Instruction per week: 5
No. of credits: 3

Course Objectives:

1. Learn different food service systems.
2. Gain knowledge on production, planning, forecasting, purchasing and inventory control.
3. Understand stepping up of recipes and cost control.

	Hours
Unit I Food Service Systems	13
Traditional, Commissary, Ready prepared – cook chill, cook freeze, assembly serve.	
Unit II Production, Planning and Standardization of recipes	15
Production forecasting, planning, production scheduling, standardization of recipes, portion control, Stepping up of recipes of different cuisines	
Unit III Menu planning	12
Definition of menu, menu classifications, techniques of writing a menu, menu presentation, menu evaluation, purchasing procedures, procurement, product selection, specification, and method of purchasing.	
Unit IV Receiving and Storage	12
Receiving, storage, inventory control and issuing	
Unit V Quantity Food Production	23
Product standards, effective utilization of leftovers, waste disposal, Equipment for large scale production, holding and service, cost control, menu pricing.	
Total Hours	75

Text Books:

1. **Sethi M. and Malhan S.M., Catering Management an integrated approach (2015), 3rd edition,** Published by New Age International Private Limited.
2. **Parvinder S. Bali, Quantity Food Production Operations and Indian Cuisine (2011),** published by Oxford University Press.
3. **Palacio, J.P., Harger, V., Shugari, G. Thesis, M (2001).** West and Wood's Introduction to Food Service. MacMillan Pub Co., New York.

Reference Books:

1. **Thangam Philip (2005).** Modern Cookery. Orient Longman Limited. Third edition.
2. **Khan, M. A (2003).** Food Service Operations. AVI Publications Co., Connecticut.
3. **Cesarini, V. Kinton, R (2002).** Practical Cookery. seventh edition. Hodder and Stoughton publishers.

Websites:

1. <https://www.fao.org>
2. <https://www.apeda.gov.in>
3. <https://www.ncbi.nlm.nih.gov>
4. <https://study.com>

Course Outcomes:

1. Comprehend food service systems.
2. Plan and forecast production schedules.
3. Select appropriate purchasing procedures and issuing.
4. Skill in stepping up recipes of different cuisines
5. Manage a large-scale food production unit

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	M	L	H	L	M	L	L	M	M	H	H	H	M	H
CO 2	M	M	H	L	M	L	L	M	M	H	H	H	M	H
CO 3	M	M	H	L	M	L	L	M	M	H	H	H	M	H
CO 4	M	L	H	L	M	L	L	M	M	H	H	H	M	H
CO 5	M	L	H	L	M	L	L	M	M	H	H	H	M	H

Food Product Development and Packaging

Semester VI
21BFDC28

Hours of Instruction per week:5
No. of credits:3

Course Objectives:

1. Learn various foods processing technology.
2. Develop food products that meet consumer requirements and demands.
3. Gain knowledge on ready to eat and ready to cook foods.

Content	Hours
Unit I Introduction to new food product development Definition, significance of product development, food needs and consumer preferences. Steps involved in food product development, Intellectual Property Rights and patenting of foods.	10
Unit II Evaluation of food product Sensory, characteristics of foods, sensory and objective evaluation of food, assessing the sensory characteristics of food – color, texture, flavor, odor and taste.	10
Unit 3 Food Processing techniques Cereals- Extrusion products-noodles, pastas, macaroni, rice sticks, puffed pulses and parched. Flesh foods -fish fingers, fish products, meat and poultry products, sausage and tinned and canned products.	20
Unit 4 Customized Food Processing Techniques Foods for defense services, space foods, sports foods, and health foods, designer foods, value added foods and convenience foods. Vegetable and Fruits- Canning and bottling methods, processing techniques ,jams, jellies, squashes, pickles, dried foods and standard used.	10
Unit 5 Food Packaging and labeling Importance, definition, principles and basic FSSAI laws governing food packaging. Types of packaging material - metal, glass, paper, plastic, edible and other miscellaneous packaging materials. Packages with special features - Boil-in-bag package, plastic-shrink package, cryovac film, microwave oven packaging and high barrier plastic bottles. Labeling: Functions and types of labeling. Nutrition information in labeling. Definition, importance and functions of nutrition labeling. Standards and regulations for nutrition labeling. Nutrition claims in food labels	25
Total Hours	75

Text Books:

1. **Fellow. P.J. (2017).** Food Processing Technology Principles and Practices. Fourth Edition. Woodhead publishing is an imprint of Elsevier, England
2. **Srilakshmi, B (2007).** Food Science. New Age International Limited, New Delhi.
3. **India Research Institute (2007),** Hand book of Packaging Technology EIRI Board of Consultants and Engineers.
4. **Watson, David, H (2003).** Performance Functional Foods. CRC Press woodland Publishing limited, England.
5. **Sivasankar, B. (2002),** Food Processing and preservation Sixth edition, PHI Learning Private Limited India.

Reference Books:

1. **Suwendu Bhattacharya (2014)** “Conventional and advanced food processing technologies” First edition, John wiley & Sons. Ltd.
2. **Gordon L. Robertson (2012)** “Food packaging – Principles and Practices” Third edition Taylor and fancies group, LLC.
3. **Norman N. Potter (2013)** “Food Science” Fourth edition, Springer Science and business media.
4. **Jung H. Han (2013)** “Innovations in Food Packaging” Second edition Academic press is an imprint of Elsevier, England.
5. **Shakuntala Manay, NA. and N. Shadak Sharaswamy, (2007),** Foods, Facts and Principles, 2nd Edition New Age International Publishers, New Delhi.
6. **Sudhir Gupta (2007).** Handbook of Packaging Technology. Engineers India Research Institute. New Delhi.
7. **Brown, A., (2006)** Understanding Food Principles and Preparations, Wadsworth Publishers, U.S.
8. **Sharma, A., (2006)** Text Book of Food Science and Technology, Published by International Book Distributing Co., First Edition.
9. **Webb, G.P (2006).** Dietary Supplementation and Functional Foods. Blackwell Publishing limited, New York.
10. **Fuller, Gordon (2005).** New Food Product Development. Second edition. CRC Press. Boca Raton, Florida.
11. **Lyon, D.H, Francombe, M.A, Hasdell, T.A, Lawson, K (eds), (2002),** “Guidelines for Sensory Analysis in Food Products Development and Quality Control”, Chapman and Hall, London.
12. **Srivastava. R.P, Sanjeev Kumar (2000).** Fruit and Vegetables Preservation, Principles and Practices. Second edition. International Book Distributing Company, Lucknow, India.

Websites:

1. <https://www.mofpi.gov.in>
2. <https://www.apeda.gov.in>
3. <http://www.iifpt.edu.in>
4. <https://www.fssai.gov.in>

Course Outcomes:

1. Know the recent concepts in food product development.
2. Translate theoretical knowledge in evaluation of food products.
3. Gain in-depth knowledge in appropriate foods processing techniques and in laws governing food packaging and labeling.
4. Develop ready to eat and serve food products in choosing appropriate methods of food preservation.
5. Implement food quality control using modern and digital tools.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	L	H	M	M	H	H	H	-	H	H	H	H	H
CO 2	H	M	M	L	M	M	H	M	-	M	M	H	M	H
CO 3	H	L	M	H	M	H	H	M	-	H	M	H	M	M
CO 4	H	M	H	M	L	M	M	M	-	M	H	H	M	L
CO 5	H	M	H	M	M	M	L	L	-	M	M	H	H	M

Quantity Food Production Practical

Semester VI

21BFDC29

Course Objectives:

Hours of instruction per week: 3

No. of credits: 2

1. Gain skill on standardization of recipes.
2. Plan a large scale of different cuisines.
3. Prepare different types of menus for events.

Hours

Unit 1 Menu Planning

6

Plan menu for different types of food service institutions- commercial and non-commercial food service institutions.

Unit II Standardization of recipes

9

Standardization of recipes of Indian and Continental cuisines, Portion control techniques, Pricing.

Unit III Indian Cuisine

12

Stepping up of recipes for cuisine – State and Regional, Pricing and sales.

Unit IV Stepping up of recipes

9

Stepping up of recipes for continental and oriental cuisines.

Unit V Preparation of Cuisines

9

Preparation of menus for different types of events. Pricing and sale of products.

Total Hours

45

Text Books:

1. **David Foskett, Patricia Paskins, Andrew Pennington, Neil Rippington (2016)**, Theory of Hospitality and Catering, 13th edition, published by Hachette UK.
2. **Sethi M. and Malhan S.M., Catering Management an Integrated approach (2015)**, 3rd edition, Published by New Age International Private Limited.
3. **June Payne-Palacio, Monica Theis, Introduction to Foodservice (2009)**, 11th illustrated, Published by Pearson/Prentice Hall.

Reference Books:

1. **Lea R. Dopson, David K. Hayes (2015)**, Food and Beverage cost control, 6th edition; John Wiley and Sons.
2. **John Cousins, Dennis, Lillicrap, Suzanne Weekes, Food and Beverage Service (2014)**, 9th edition, published by Hachette UK.
3. **Cesarani, V. Kinton, R (2002)**. Practical Cookery. Seventh edition. Hodder and Stoughton publishers.

Websites:

1. <https://www.fao.org>
2. <https://www.apeda.gov.in>
3. <https://www.ncbi.nlm.nih.gov>
4. <https://study.com>

Course Outcomes:

1. Plan menus for food service institutions.
2. Standardize recipes for different cuisines at a large scale
3. Competent to prepare Indian and continental cuisines
4. Manage quantity food production, pricing and sale of the product.
5. Organize food production for different events.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	L	H	H	H	M	L	M	L	H	H	H	H	H
CO 2	H	L	H	H	H	M	M	M	M	H	H	H	H	H
CO 3	H	L	H	H	H	M	L	M	L	H	H	H	H	H
CO 4	H	L	H	H	H	M	L	M	H	H	H	H	H	H
CO 5	H	L	H	H	H	M	H	M	H	H	H	H	H	H

Food Product Development Practical

Semester VI
21BFDC30

Hours of Instruction per week: 3
No. of Credits: 2

Course Objectives:

1. Formulate products that are nutritionally and commercially viable.
2. Acquire skills to develop food products from farm to table.
3. Understand the packaging techniques and the role of packaging materials in product development.

	Hours
Unit I Evaluation of Food Products Evaluating the acceptability of foods by subjective and objective methods, Textural measurement of various food samples using texture analyzer.	9
Unit II Formulation of Novel Food Products Formulation of selected cereal based and pulse-based food products, nutritional supplementary and health foods. Extrusion products: Noodles, pastas, macaroni, rice sticks	9
Unit III Vegetable and Fruit Preserves Development of fruit juices, squash, syrups, cordial, jam, jelly, marmalade, fruit toffees, preparation of pickles, ketchup, sauces, vathal and vadagam.	9
Unit IV Instant and Value-added Products Development of instant foods (RTS & RTE), convenience foods, designer foods and Value addition of selected recipes.	9
Unit V Food Packaging and Labeling Selection of suitable packaging materials, Product and nutritional labeling, cost calculation and marketing.	9
Total Hours	45

Text Books:

1. **Fellow. P.J. (2017).** Food Processing Technology Principles and Practices. Fourth Edition. Woodhead publishing is an imprint of Elsevier, England
2. **Srilakshmi, B (2007).** Food Science. New Age International Limited, New Delhi.
3. **Hand book of Packaging Technology (2007) - EIRI Board of Consultants and Engineers.** India Research Institute.
4. **Watson, David, H (2003).** Performance Functional Foods. CRC Press woodland Publishing limited, England.

Reference Books:

1. **Sudhir Gupta (2007).** Handbook of Packaging Technology. Engineers India Research Institute, New Delhi.
2. **Webb, G.P (2006).** Dietary Supplementation and Functional Foods. Blackwell Publishing limited, New York.
3. **Fuller, Gordon, W (2005).** New Food Product Development. Second edition. CRC Press, Boca Raton, Florida.
4. **Yeshayahu Pomeranz and Clifton E. Meloan, (2002).** Food Analysis & Theory & Practice, 1st Indian ed. CBS Publisher & Distributors, New Delhi.
5. **Srivastava, R.P., Sanjeev Kumar (2000),** Fruit and Vegetables Preservation, Principles and Practices. Second edition. International Book Distributing Company, Lucknow, India

Websites:

1. <https://www.mofpi.gov.in>
2. <https://www.apeda.gov.in>
3. <https://www.fssai.gov.in>

Course Outcomes:

1. Evaluate the acceptability of food products using different methods
2. Formulate cereal and pulse-based products.
3. Develop vegetable and fruit preserves.
4. Design and create novel instant value added and designer food products.
5. Choose appropriate packaging materials and interpret labeling information

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H	L	H	M	M	H	H	H	-	H	H	M	H	H
CO 2	H	M	M	L	M	H	H	M	-	M	M	H	M	H
CO 3	H	L	M	H	M	H	H	M	-	L	M	H	M	M
CO 4	M	M	H	M	L	M	M	M	-	M	H	H	M	L
CO 5	H	M	H	L	M	M	L	L	-	M	M	H	H	M

Environmental Studies
(Ability Enhancement Compulsory Course AECC)
(Applicable for Undergraduate students admitted from the academic year
2021 & onwards)

Semester I
21BAES01

Hours of Instruction per week: 60
No. of Credits: 4

	Hours
Unit I Introduction to Environmental studies and Ecosystems Multidisciplinary nature of environmental studies; components of environment - atmosphere, hydrosphere, lithosphere and biosphere. Scope and importance; Concept of sustainability and sustainable development. What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession. Case studies of the following ecosystems a) Forest ecosystem b) Grassland ecosystem c) Dessert ecosystem d) Aquatic ecosystems (ponds, stream, lakes, rivers, oceans, estuaries)	10
Unit II Natural Resources: Renewable and Non-renewable resources Land resources and land use change; land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water: Use and over-exPOitation of surface and ground water, floods, droughts, conflicts over water (international & inter state). Heating of earth and circulation of air, air mass formation and precipitation. Energy resources: Renewable and Non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.	10
Unit III Biodiversity and Conservation Levels of biological diversity: genetic, species and ecosystem diversity; Biogeography Zones of India; Biodiversity patterns and global biodiversity hot spots. India as a mega-biodiversity nation; Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions, conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.	10

Unit IV Environmental Pollution, Policies & Practices**10**

Environmental pollution: types, causes, effects and controls; Air, Water, Soil, chemical and noise Pollution.

Nuclear hazards and human health risks

Solid waste management: Control measures of urban and industrial waste.

Pollution case studies.

Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.

Environmental Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention & Control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; International Agreements; Montreal and kyoto protocols and conservation on Biological Diversity (CBD). The Chemical Weapons Convention (CWC).

Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian context.

Unit V Human Communities and the Environment**15**

Human population and growth: Impacts on environment, human health and welfares.

Carbon foot-print.

Resettlement and rehabilitation of project affected persons; case studies.

Disaster management: floods, earthquakes, cyCOnes and landslides,

Environmental Movements: Chipko, Silent Valley, Bishnios of rajasthan.

Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.

Environmental Communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

Field Work**15**

Visit to an area to document environmental assets; river/forest/flora/fauna, etc.

Visit to local polluted site- Urban/Rural/ Industrial/Agricultural.

Study of common plants, insects, birds and basic principles of identification.

Study of simple ecosystems- pond, river, Delhi Ridge, etc.

Total Hours 70

Reference Books:

1. **Singh, J.S, Singh, S.P. & Gupta, S.R. (2014).** Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
2. **Grumbine, R. Edward, and Pandit, M.K. (2013).** Threat's from India's Himalayadams. Science, 339:36-37.
3. **Sodhi, N.S., Gibson, L.& Raven, P.H.(eds). (2013).** Conservation Biology: Voices from the Tropibcs. John Wiley & Sons.
4. **Raven, P.H., Hassenzahl, D.M & Barg, L.R (2012).** Environment. 8th edition. India.
5. **Pepper, I.L., Gerba, C.P. & Brusseau, M.L.(2011).** Environmental and Pollution Science.Academic press.
6. **Wilson, E.O. (2006).** The Creation: An appeal to save life on Earth. New York: Norton.
7. **Groom, Martha J. Gary K. Meffe, and Carl Ronald Carroll (2006).** Principles of Conservation Biology. Sounderland: Sinauer Associates,
8. **Sengupta, R.(2003).** Ecology and Economics: An approach to sustainable development. OUP.
9. **Carson, R. (2002).** Silent Spring, Houghton Mifflin Harcourt.
10. **Rosencranz, A., Divan, S., & Noble, M.L. (2001).** Environmental Law and Policy in India.
11. **McNeil, John R. (2000).** Something new under the Sun: An Environmental History of the 20th Century.
12. **Gleeson,B. nad Low, N.(1999).** Global Ethics and Environment, London, Routledge.
13. **Rao, M.N. & Datta, A.K. (1998).**Waste Water Treatment. Oxford & IDH publishing Co. Pvt.Ltd.
14. **Thapar, V.(1998).** Land of the Tiger: A Natural History of the Indian Subcontinent.
15. **McCully, P.(1996).** Rivers no more: the environmental effect of dams (pp.29-64). Zed books.
16. **Gadgil, M.,& Guha, R.(1993).** This Fissured Land: An Ecological History of India. Univ. of California Press.
17. **Gleick, P.H. (1993).** Water in Crisis. Pacific Institute for studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
18. **Odum, E.P., Odum, h.T. & Andrews, J.(1971).** Fundamentals of Ecology. Philadelphia: Saunders.
19. **Warren, C.E.(1971).**Biology and Water Pollution Control. WB Saunders.

Websites:

1. www.nacwc.nic.in
2. www.opcw.org

Fundamentals of Research

Semester II
21BAFU01

Hours of instruction per week: 2
No. of credits: 2

Course Objectives:

- 1.To introduce the importance of research.
- 2.To impart knowledge on the methods of data collection and analysis
- 3.To give basic foundation of statistics.
- 4.To introduce the skill of report writing

	Hours
UNIT I Introduction to Research Definition – Significance of Research – Types of Research – Scope of Research – Defining the research problem – Steps in Research – importance of research problem – Research Objectives – Research Protocol – outcomes of research – Understanding concepts, constructs, variables.	5
UNIT II Tools for Collection of Data Methods of data collection – Primary and Secondary data collection methods, qualitative methods of data collection and survey methods of data collection-Most popular methods: Direct observation, Experiments and Survey-Population and sampling – Types of sampling.	6
UNIT III Statistical Methods Basics of data analysis - Measurement Scales, Sources of error in measurement. Measures of central tendency (Mean, Median, Mode), Measures of dispersion (Range, Mean Deviation, Standard Deviation) - Diagrammatic and Graphical representation of Data.	5
UNIT IV Inferential statistics Types of hypothesis- Testing of Hypothesis - Type I and Type II error- Testing the difference between means (Z & t-test), ANOVA and Chi square test (basics only)	5
UNIT V Report Writing Report generation –Report writing - Bibliography – Importance of Research Ethics and Integrity- Misconduct in research and consequences of misconduct	6
Practical session Identifying a problem and using appropriate statistical tools	3
Total Hours	30

Text Book:

1. **Kothari C.R (2016).**Research Methodology, Sultan Chand publications, New Delhi

Reference Books:

1. **Krishnaswami O.R, Ranganatham M (2016).**Methodology of Research in Social science, Himalaya Publishing House, Delhi.
2. **Paneerselvam. R (2016).** Research methodology, PHI learning, New Delhi.
3. **Deepak Chawla and Neena Sodhi (2016).**Research Methodology, Vikas Publishing House, New Delhi.
4. **Gupta, S.P. (2007).**Statistical Methods, Sultan Chand & Son Publications, New Delhi.

Websites:

1. <https://www.ncbi.nlm.nih.gov>
2. <https://www.cusb.ac.in>
3. <http://www.aau.in>