SEMESTER I

Theory: Major 1 - Basics of Food and Nutrition-I (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
4.5	**I**	**806201**	**Basics of Food and Nutrition-I**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

1.To study the different methods of cooking foods

2. To obtain knowledge of different food groups, their composition and nutrients present in the foods

3.To understand the vital link between foods, nutrition and health

Course Outcome:

At the end of the course, students will

1. Gain knowledge of Nutrition
2. Get familiar with different methods of cooking
3. Get acquainted with practical knowledge of nutrient rich foods
4. Acquainted the vital link between foods, nutrition and health.

Unit	**Content**	**Hrs**	**Weightage of Marks Allotted**	**Incorporation of Pedagogy**
Unit-I	Food and Nutrition • Food-Principles, meaning, classification and functions, basic food groups, energy factors affecting total energy requirements of the body. Balanced diet- definition and factors affecting a balanced diet	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	Cooking methods: Moist heat methods like Boiling, Simmering, Poaching, Steaming, Pressure cooking • Dry heat methods: Air as medium of cooking: Grilling, broiling, roasting, Baking • Fat as medium of cooking: Sautéing, Shallow fat frying, Deep fat frying • Combined (Moist and dry) Methods: Braising, Stewing • Other cooking methods: -Microwave cooking, and Solar cooking. • Advantages and Disadvantages of Cooking Methods	8		
Unit-III	Nutrition: Concept and meaning Nutrients (macro and micro), protein, carbohydrate, fat, Vitamins, minerals, water-sources, classification, functions, requirements, digestion and absorption	7		
Unit-IV	Traditional methods of enhancing nutritional value of foods: Germination, fermentation, supplementation, substitution, Fortification and enrichment etc.	8		

References:	1. Sumati R.Mudambi, Fundamental of Food and nutrition diet therapy New age International private limited, New Delhi 6th edition 2018 2. M. Swaminathan. Food and nutrition the Bangalore press. 3. Punita Sethi and Poonam Lakda Aahar Vigyan ,Suraksha EvamPoshan ; Elite Publishing House, New Delhi 2015 4. Suggestive digital platform sweblinks- e PG- Pathshala, IGNOU and UPRTOU online study material.Swayam portal http:// hecontent.upsdc.gov.in/ Home.aspx 5. Maney S (2008). Foods, Facts and Principles, 3 rd Edition Published by Wiley Eastern, New Delhi. 6. Usha Chandrasekhar (2002) Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., New Delhi. 7. Raina U, Kashyap S, Narula V, Thomas S Suvira, VirS, Chopra S (2010) Basic Food Preparation: A Complete Manual, 4 th Edition, Orient Black Swan Ltd, Mumbai. 8. Srilakshmi, B. (2017) Nutrition Science, New Age International (P) Ltd., New Delhi. 9. Mahtab, S. Bamji, Kamala Krishnasamy, Brahmam G.N.V (2012) Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi. 10.SunetraRoday (2017). Food Science and Nutrition, Oxford University Press, New Delhi. 11. Longvah, T, Ananthan, R., Bhaskarachary, K., Venkaiah, K (2017). Indian Food Composition Tables (IFCT), Indian Council of Medical Research, National Institute of Nutrition, Hyderabad
Model Questions:	Long Type - 2 Questions Short Type - 2 Questions

Practical: Basics of Food and Nutrition- I (P)							
Level	**Semester**	**Course code**	**Course Name**	**Credits**	**Teaching Hours/week**	**Exam Duration**	**Maximum marks**
4.5	**I**	**806202**	**Basics of Food and Nutrition-I**	**2**	**2**	**2Hrs**	**External- 25 Marks Internal- 25 Marks**

Course Objectives:

1.Understandtheprinciplesunderlyingchangesinfoodcharacteristicsduringcooking
2.Develop skills in preparing various food items
3.Get familiar with evaluation of food products for their quality characteristics.

Course Outcome: At the end of the course, students will

1. Gain knowledge of Nutrition
2. Students will get familiar with different methods of cooking
3. Get acquainted with practical knowledge of nutrient rich foods
4. Gain knowledge of functions of various ingredients.

-List of Practical in Basics of Food and Nutrition

Introduction to laboratory and the various equipment (demonstration)
Understanding weights and measure
Learn to weigh food ingredients, introduction to various means of measurement, method to measure fruits/Vegetables.

Methods and medium of cooking
Various methods of cooking (with examples of recipes)
Advantages/disadvantages of various methods, temperature and medium of cooking.

Food Guide and RDA
Introduction of food guide, its uses, RDA,

Basic Cooking skills, Weighing of raw materials, Different style of cutting fruits and vegetables, Salad Decoration/Dressing

Prepare at least one recipe from each of the following groups

- Protein rich
- Carbohydrate
- Fat rich
- Vitamins, Minerals, Fiber rich
- Preparing, serving and evaluation of the above food items

SEMESTER II

Theory: Major 2- Basics of Food and Nutrition- II (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
4.5	**II**	**806208**	**Basics of Food and Nutrition-II**	**2**	**2**	**2Hrs**	**External-30 Mark Internal-20 Mark**

Course Objectives:

1. To understand the factors to be considered during selection of basic food commodities
2. Study the different methods of cooking foods
3. Obtain knowledge of different food groups, their composition and nutrients present in the foods
4. Understand the vital link between foods, nutrition and health.

Course Outcome:

At the end of the course, students will

1. Gain knowledge of Nutrition

2. Students will get familiar with different methods of cooking

3. Get acquainted with practical knowledge of nutrient rich foods

4. Gain knowledge on functions, requirements and effects of deficiency of nutrients

Unit	**Content**	**Hrs**	**Weightageof Marks Allotted**	**Incorporation of Pedagogy**
Unit-I	**Cereal and millets** - cereal products, breakfast cereals, ready to eat food, structure processing, using various preparations **Pulses and legumes**- structure, processing nutritional aspects, use in various preparations	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	**Milk and milk products**-composition, processing, use in Different preparations, nutritional aspects, shelf life and storage. **Eggs**-structure, nutritional aspects and use in different Preparations	8		
Unit-III	**Meat, fish and poultry**: -Nutritional aspects, types, selection and spoilage **Vegetable and fruits**: -nutritional aspect, use in Different preparations and selection	7		
Unit-IV	**Sugar and sugar products-** of natural sweeteners, use as preserves stages in sugar cookery **Fats and oils**: - types, sources processing used in different preparations, nutritional aspects	8		

References:

1.Lavis S 1988 food commodities heinmann limited London
2.Hughes,O.& Bennion,M 1970 Introductory Foods,Macmillan & co New York
3.Pyke M 1974 : Catering services and technology John mure pube London
4.Raheena Begum M,(2009), A Textbook of Foods, Nutrition and Dietetics. Sterling publishers, New Delhi
5.Mudambi S. R. and Rajagopal M. V., (2008),Fundamentals of Foods, Nutrition & Diet therapy by New Age International Publishers, New Delhi
6.Sri Lakshmi B.(2009),Human Nutrition. New Age International Publishers, New Delhi
7.Swaminathan M. (2002), Advanced text book on Food and Nutrition. VolumeII. Bappco.
8.Philip T. E. (1988) :Modern cookery for teaching and the trade 4th edition Orient logman Bombay
9.Dowell,P,Balley,A. (1980): The book of ingredients, Dorfing Kindersley Ltd. London.
10. Prithi.J.S. (1979): Spices and Condiments,National Book Trust, New Delhi

Model Questions:

Long Type - 2 Questions
Short Type - 2 Questions

Practical : Basics of Food and Nutrition – II (P)							
Level	**Semester**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/week**	**Exam Duration**	**Maximum marks**
4.5	**II**	**806209**	**Practical in Basics of Food and Nutrition – II**	**2**	**2**	**2Hrs**	**External-25 Marks Internal- 25 Marks**

Course Objectives:

1.Study the different methods of cooking foods

2.Obtain knowledge of different food groups, their composition and nutrients

3.Understand the vital link between foods, nutrition and health

4.Gain knowledge on functions, requirements and effects of deficiency of nutrients

Course outcome: At the end of the course, students will

1. Develop skills in preparing various food items
2. Understand the principles underlying changes in food characteristics during cooking
3. Understand the use of various methods of preservation of food
4. Acquire knowledge on deficiency of nutrients

List of Practical in Basics of Food and Nutrition –II	
1	Standardizing methods for preparing recipes from cereals
2	Pulses, legumes and oilseeds cookery- soaking, germination, fermentation Milk and milk products-Standardizing methods for preparing paneer, curd, custard,
3	Egg Cookery-Preparation of hard- and soft-boiled egg, role of egg in cookery.
4	Vegetable cookery- Standardization of various vegetable recipes
5	Fruits cookery-Standardization of Fruit recipes
6	Visit to Food Processing-Packaging industry, research laboratory.

SEMESTER III

Theory: Major 3 - Fundamental of Food Science (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5.0	**III**	**806216**	**Fundamental of Food Science (T)**	**2**	**2**	**2 Hrs**	**External-30 Mark** **Internal- 20 Mark**

Course Objectives:

1. To study the different methods of cooking foods
2. To obtain knowledge of different food groups, their composition and nutrients present in the foods
3. To understand the vital link between foods, nutrition and health

Course Outcome:

At the end of the course, students will

1. Gain knowledge of Nutrition
2. Get familiar with different methods of cooking
3. Get acquainted with practical knowledge of nutrient rich foods
4. Be acquainted with the vital link between foods, nutrition and health

Unit	**Content**	**Hrs**	**Weightage of Marks** **Allotted**	**Incorporation of Pedagogy**
Unit-I	· Introduction to Food Science: Introduction, Properties and definition of food science and terms used in food science · Cereals, Millets and their products Processed products of wheat and rice. ● Millets and its food uses. ● Germination and Malting of Grains – process, characteristics, Nutritional benefits and uses Fermented foods (brief) ● Mechanism of fermentation and changes occurring during fermentation.	7		Demonstration, Class room study Self-study · Experiential learning · Assignment designing · Participative learning · demonstrations, Exercises on observation and follow up with group Discussions, case studies, ICT enabled teaching and learning experiences in terms of video Lessons and documentary film shows.
Unit-II	Legumes ● Factors affecting the cooking quality of legumes (soaking, fermentation, extrusion, germination and puffing) ● Anti-nutritional factors Nuts and oilseeds Oilseeds – Composition, Processing and Food uses	8		
Unit-III	Vegetables and fruits ● Classification and nutrient composition of fruits and vegetables. ● Pigments – Types, Effects of cooking media on colour, texture and acceptability. ● Browning reaction and its prevention.	7		

	Sweetening Agents (Brief) ● Sugar, Jaggery, Honey etc. ● Crystallization of sugar and its application in food preparations. ● Fortifying Sugars and Candies Artificial Sweetening agents – Composition and uses			
Unit-IV	Milk and milk products ● Effect of heat, acid and enzyme on milk ● Factors affecting the quality ● Processing of milk Eggs Grading, Factors affecting the quality. ● Effect of cooking on eggs and role of egg in different preparations Meat, poultry and fish ● Structure of muscles and meat quality ● Post-mortem changes Factors to be considered in selection and preparation of meat, poultry and fish	8		
References:	1. Mudambi, S. R. (2018). *Fundamentals of food and nutrition diet therapy* (6th ed.). New Age International Pvt. Ltd. 2. Swaminathan, M. (n.d.). *Food and nutrition*. The Bangalore Press. 3. Sethi, P., & Lakda, P. (2015). *Aahar Vigyan, Suraksha evam Poshan*. Elite Publishing House. 4. e-PG Pathshala, IGNOU, UPRTOU online study material, SWAYAM portal. (n.d.). Retrieved from http://hecontent.upsdc.gov.in/Home.aspx 5. Maney, S. (2008). *Foods: Facts and principles* (3rd ed.). Wiley Eastern. 6. Chandrasekhar, U. (2002). *Food science and application in Indian cookery*. Phoenix Publishing House Pvt. Ltd. 7. Raina, U., Kashyap, S., Narula, V., Thomas, S., Suvira, V., & Chopra, S. (2010). *Basic food preparation: A complete manual* (4th ed.). Orient Black Swan Ltd. 8. Srilakshmi, B. (2017). *Nutrition science*. New Age International Pvt. Ltd. 9. Bamji, M. S., Krishnasamy, K., & Brahmam, G. N. V. (2012). *Textbook of human nutrition* (3rd ed.). Oxford & IBH Publishing Co. Pvt. Ltd. 10. Roday, S. (2017). *Food science and nutrition*. Oxford University Press. 11. Longvah, T., Ananthan, R., Bhaskarachary, K., & Venkaiah, K. (2017). *Indian food composition tables*. National Institute of Nutrition. 12. Hughes, O., & Bennion, M. (1970). *Introductory foods*. Macmillan & Co. 13. Pyke, M. (1974). *Catering services and technology*. John Mure, London. 14. Begum, R. M. (2009). *A textbook of foods, nutrition and dietetics*. Sterling Publishers. 15. Philip, T. E. (1988). *Modern cookery for teaching and the trade* (4th ed.). Orient Longman. 16. Potter, N. N. (n.d.). *Food science*. CBS Publishers. 17. Fitch, J. J., & Francis, C. A. (1953). *Foods and principles of cookery* (1st ed.). Prentice Hall Inc. 18. Peckham, G. C. (1969). *Foundations of food preparation*. Macmillan Company.			
Model Questions:	Long Type - 2 Questions Short Type - 2 Questions			

Theory: Major 4 - Human Physiology and Anatomy (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5.0	**III**	**806218**	**Human Physiology and Anatomy**	**2**	**2**	**2Hrs**	**External-30 Mark** **Internal- 20 Mark**

Course Objectives:

1. To learn Human physiology to correlate its relevance to nutrition
2. To know the various human systems
3. To understand the human anatomy

Course Outcome:

At the end of the course, students will be able to-

1. Understand the physiology of human body
2. Know the integrated functions of all systems of the body

Unit	**Content**	**Hrs**	**Weightage of Marks Allotted**	**Incorporation of Pedagogy**
Unit-I	Nutrition and Human Physiology ● Human physiology and its relevance to nutrition ● Introduction to Human body- Definition, Anatomy and Physiology, Cells and tissues in the human body ● Skeletal system - function, types of bone, classification of bones and calcification of bones ● Introduction to human system, role of nutrient in immune system	7		Demonstration, Class room study ● Self-study ● Experiential learning ● Assignment designing ● Participative learning
Unit-II	Cardiovascular system ● Blood - Introduction, Composition and functions of blood, RBC, WBC, platelets and plasma ● Anatomy of Heart and function ● Blood pressure, types of circulation ● Role of cardiovascular system in nutrient transport	8		
Unit-III	Digestive system ● Introduction to parts of digestive system - teeth and mastication, salivary gland, pharynx, oesophagus, stomach, small and large intestine, duodenum, liver, gall bladder, pancreas ● Process of digestion ● Role of digestive system in digestion, absorption and assimilation of nutrient	7		

Unit-IV	Excretory System and Endocrine System ● Structure of kidney and its functions, structure of Nephrons and its functions (formation of urine) excretion of nitrogenous waste from protein metabolism ● Endocrine System- Introduction and function of endocrine glands ● Functions of hormones -Insulin, Glucagon, somatostatin, gastrin, cholecystokinin (CCK), Cortisol, Adrenaline, TSH t3 and t4	8		
References:	1. Indira Gandhi National Open University. (n.d.). *Applied physiology (MFM001)*. IGNOU. 2. Vander, A. J., Sherman, J. H., & Luciano, D. S. (2000). *Human physiology* (7th ed.). McGraw-Hill. 3. Jain, A. K. (n.d.). *Textbook of physiology* (Vols. I & II). Avichal Publishing Co. 4. Guyton, A. C., & Hall, J. B. (1996). *Textbook of medical physiology* (9th ed.). W.B. Saunders Company / Prism Books Pvt. Ltd.			
Model Questions:	Long Type - 2 Questions Short Type - 2 Questions			

Practical 8 : Fundamental of Food Science (P)

Level	Semester	Course code	Course Name	Credits	Teaching Hours/ Week	Exam Duration	Maximum marks
5.0	**III**	**806217**	**Fundamental of Food Science**	**2**	**2**	**2Hrs**	**External-25 Marks** **Internal- 25 Marks**

Course Objectives:

1. To know the chemical composition of m
2. To understand the processing of various types of products
3. To understand chemical composition of foods

Course Outcome: At the end of the course, students will

1. Understand the processing of food
2. Get acquainted with the different chemical methods

List of Practical in Fundamental of Food Science

1. Cereals

a) Gelatine of cereal flours (compare the time taken for gel formation and consistency).

b) Observation of cooking time & quality of steamed, aged & par boiled rice.

2. Pulses – Effect of soaking, sprouting, addition of acid, alkali on cooking quality (any one or two pulses like green gram, Bengal gram, cowpea etc)

3. Vegetables & Fruits

a) Effect of adding acid & alkali on green, red, yellow & white vegetables

b) Methods of preventing browning

4. Milk & milk products

a) Factors affecting curdling of milk (demonstration)

5. Eggs a) Demonstration of grading eggs for quality b) Effects of beating egg white on stiffness of foam & its uses (Custard & Omelette)
6. Sugar cookery – Determination of stages of crystallization & its uses
7. Pre-processing techniques – Malting, germination, fermentation

Theory: IKS Indian Traditional food (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5.0	**III**	**806219**	**IKS Indian Traditional Food**	**2**	**2**	**2Hrs**	**External-30 Mark** **Internal- 20 Mark**

Course Objectives:

1. Understand the historical, cultural and geographical influences on Indian cuisines
2. Undesand the concept of food as medicine
3. Learn traditional processing techniques.
4. To preserve and promote Indian food heritage

Unit	Content	Hrs	Weightage of Marks Allotted	Incorporation of Pedagogy
Unit-I	· Traditional Methods of Food Processing Traditional methods of milling grains – rice, wheat and corn – equipments and processes as compared to modern methods. · Equipments and processes for edible oil extraction, paneer, butter and ghee manufacture – comparison of traditional and modern methods. · Energy costs, efficiency, yield, shelf life and nutrient content comparisons.	7		Demonstration, Class room study · Self-study · Experiential learning · Assignment designing · Participative learning
Unit-II	Traditional methods of food preservation – sun-drying, osmotic drying, brining, pickling and smoking	8		
Unit-III	· Traditional Food Patterns Typical breakfast, meal and snack foods of different regions of India. · Regional foods that have gone Pan Indian / Global. · Popular regional foods; Traditional fermented foods, pickles and preserves, beverages, snacks, desserts and sweets, street foods.	7		
Unit-IV	· Health Aspects of Traditional Foods Comparison of traditional foods with typical fast foods / junk foods – cost, food safety, nutrient composition	8		
References:	Sen, Colleen Taylor Food Culture in India Greenwood Press, 2005. Davidar, Ruth N. Indian Food Science: A Health and Nutrition Guide to Traditional Recipes: East West Books, 2001			
Model Questions:	Long Type - 2 Questions Short Type - 2 Questions			

SEMESTER IV

Theory: Major 5 -Therapeutic Nutrition (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5.0	**IV**	**806225**	**Therapeutic Nutrition**	**2**	**2**	**2 Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

1. To gain knowledge about diet therapy
2. To understand the role of dietician in maintaining good nutritional status.
3. Design or formulate different therapeutic diets for various disease conditions

Course Outcome:

At the end of the course, students will

1. Manage diet in maintaining good nutritional status.
2.Gain knowledge of the principles of diet therapy

Unit	**Content**	**Hrs**	**Weightage of Marks Allotted**	**Incorporation of Pedagogy**
Unit-I	Diet therapy: objectives of diet therapy, modification of normal diet through consistency: clear liquid diet, full liquid diet and soft diet ● Nutrients: high protein and low protein, high calorie and low calorie ● Texture: high fibre, low fibre diet	7		Demonstration , Class room study ● Self-study ● Experiential learning ● Assignment designing ● Participative learning
Unit-II	Nutritional management in common nutritional problems Protein calorie malnutrition, Nutritional anaemia, Goitre, vitamin A deficiency and vitamin D deficiency	8		
Unit-III	Nutritional management in common ailments requirement and diet planning - diarrhoea, gastritis, constipation, typhoid and tuberculosis	8		
Unit-IV	Nutritional management in common disorders Requirement and diet planning- Diabetes, Peptic ulcer, Arthrosclerosis, Jaundice	7		

References:

1. Antia, F. P., & Abraham, P. (2001). *Clinical nutrition and Therapeutic Nutrition*. Oxford Publishing Company.
2. Srilakshmi, B. (2007). *Therapeutic Nutrition*. K.K. Gupta for New Age International Pvt. Ltd.
3. Benion, M. (n.d.). *Clinical nutrition*. Harper and Row Publishing.
4. Escott-Stump, S., & Mahan, L. K. (2000). *Krause's food, nutrition, and diet therapy* (10th ed.). W.B. Saunders Company.
5. Passmore, P., & Eastwood, M. A. (n.d.). *Human nutrition and Therapeutic Nutrition*. Churchill Livingstone.
6. Begum, R. M. (1989). *A textbook of foods, nutrition, and Therapeutic Nutrition*. Wiley Eastern Ltd.
7. Robinson, C. M. B., Lawlea, W. L., Chenoweth, A. E., & Carwick, A. (n.d.). *Normal and therapeutic nutrition*. Macmillan Publishing Company.
8. Williams, S. R. (1993). *Nutrition, diet therapy* (7th ed.). W.B. Saunders Company.
9. Shils, M., & Wohl, R. (n.d.). *Modern nutrition in health and disease*. McGraw-Hill and Ubran, Philadelphia.
10. National Institute of Nutrition. (2015). *Dietary guidelines for Indians: A manual*. National Institute of Nutrition.

Model Questions:

Long Type - 2 Questions
Short Type - 2 Questions

Theory; Major 6 - Nutrition during life cycle (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/Week**	**Exam Duration**	**Max Marks**
5.0	**IV**	**806227**	**Nutrition During Life Cycle**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

.1 To understand the basics of recommending the dietary allowances
2. To study the nutritional needs at different stages of life span
3. To assess nutritional requirements and nutritional status of an individual

Course Outcome:

At the end of the course, students will

1. Understand the basics of recommending the dietary allowances
2. Recommend nutritional needs at different stages of life span
3. Assess nutritional requirements and nutritional status of an individual

Unit	**Content**	**Hrs**	**Weight age of Marks Allotted**	**Incorporation of Pedagogy**
Unit-I	Adequate diet and meal planning-Concept, Meaning and importance ● Factors affecting meal planning – nutritional, socio –cultural, religious, geographic, economic	7		Demonstration , Class room study ● Self-study ● Experienti al learning ● Assignme nt designing ● Participati ve learning
Unit- II	Nutrition through life cycle ● Nutrition and diet during pregnancy- importance, requirements, food Selection and menu planning ● Nutrition and diet during lactation- importance, requirements, food selection and diet	8		
Unit-III	Nutrition and diet during infancy- importance, requirements, food selection. Breastfeeding, weaning food, artificial feeding ● Nutrition and diet during preschool, childhood importance, requirements, food selection and diet	7		
Unit-IV	Nutrition and diet during adolescent period- importance, requirement ,food selection and diet ● Nutrition and diet during adulthood- importance, requirements for different work pattern, food selection and diet according to socio economic level ● Nutrition during old age- importance, requirements, food selection and diet	8		

References:

. Antia, F. P., & Abraham, P. (2001). *Clinical nutrition and dietetics*. Oxford Publishing Company.
. Srilakshmi, B. (2007). *Dietetics*. K.K. Gupta for New Age International Pvt. Ltd.
. Benion, M. (n.d.). *Clinical nutrition*. Harper and Row Publishing.
. Escott-Stump, S., & Mahan, L. K. (2000). *Krause's food, nutrition, and diet therapy* (10th ed.).
W.B. Saunders Company.
. Passmore, P., & Eastwood, M. A. (n.d.). *Human nutrition and dietetics*. Churchill Livingstone.
. Begum, R. M. (1989). *A textbook of foods, nutrition, and dietetics*. Wiley Eastern Ltd.
. Robinson, C. M. B., Lawlea, W. L., Chenoweth, A. E., & Carwick, A. (n.d.). *Normal and therapeutic nutrition*. Macmillan Publishing Company.
. Williams, S. R. (1993). *Nutrition, diet therapy* (7th ed.). W.B. Saunders Company.
. Shils, M., & Wohl, R. (n.d.). *Modern nutrition in health and disease*. McGraw-Hill and Ubran, Philadelphia.

Model Questions:	Long Type - 2 Questions Short Type - 2 Questions

Theory: Major 7 - Basic Color Technology (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5.0	**IV**	**806228**	**Basic Color Technology**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

1. Enhancing Weak Natural Colors:
2. Product Identification
3.Aligning Flavor Expectation with Visual Input:

Course Outcome:

At the end of the course, students will be able to:

1. Differentiate natural and synthetic colours
2. Explain factors affecting colour stability
3. Identify permitted colours and understand legal limits
4. Apply colours in food products safely

Unit	**Content**	**Hrs**	**Weightage of Marks Allotted**	**Incorporation of Pedagogy**
Unit-I	Introduction to Food Colours 1. Definition, need and functions of colour in food 2. History and classification of food colours 3. Natural vs synthetic colours 4. Consumer perception and psychology of colour in food	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	Natural Food Colours 1. Sources: plant, animal, microbial, mineral 2. Common natural pigments: - Chlorophylls – green - Carotenoids – yellow/orange/red - Anthocyanins – red/blue/purple - Betalains, caramel, annatto, turmeric, saffron 3. Extraction, stability, factors affecting colour 4. Uses and limitations in food industry	8		
Unit-III	Synthetic Food Colours 1. Definition and classification – coal tar dyes, lake colours 2. Permitted vs non-permitted colours as per FSSAI 3. Chemistry, properties, and stability of synthetic dyes 4. Advantages and disadvantages 5. Toxicity, health hazards, and safety evaluation	7		
Unit-IV	Regulations & Safety 1. FSSAI regulations on food colours in India 2. Codex Alimentarius standards	8		

	3. Detection and estimation of colours in foods			
References:	**Carle, R., & Schweiggert, R. M. (Eds.). (2016).** *Handbook on Natural Pigments in Food and Beverages: Industrial Applications for Improving Food Color*. Woodhead Publishing. **Socaciu, C. (Ed.). (2007).** *Food Colorants: Chemical and Functional Properties*. CRC Press **Otterstätter, G. (1999).** *Coloring of Food, Drugs, and Cosmetics*. CRC Press. https://doi.org/10.1201/978148227008 **Christie, R. M. (2026).** *Colour Chemistry* (3rd ed.). The Royal Society of Chemistry. https://doi.org/10.1039/9781847550590 *(Note: Historical editions published 2001, 2015).*2			
Model Questions:	Long Type - 2 Questions Short Type - 2 Questions			

Practical: Therapeutic Nutrition (P)							
Level	**Semester**	**Course code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Maximum marks**
5.0	**IV**	**806226**	**Therapeutic Nutrition**	**2**	**2**	**2Hrs**	**External-25 Marks Internal- 25 Marks**

Course Objectives:

1**.** Develop skill to plan and prepare therapeutic diets for prevention of disease conditions

2. Design or formulate different therapeutic diets for various disease conditions

Course Outcome: At the end of the course, students will

1. Understand the role of dietician in maintaining good nutritional status.
2. Gain knowledge of the principles of diet therapy
3. Design or formulate different therapeutic diets for various disease conditions

List of Practical in Therapeutic Nutrition (P)

1	Planning and preparation of therapeutic modified diets- fluid diet, high protein diet, low protein diet, high fibre diet, low fibre diet, calorie restricted diet
2	Modification of diets in obesity
3	Modification of diets in underweight
4	Planning and preparation of diet in following conditions protein calorie malnutrition, anaemia, goitre, vitamin A deficiency
5	Planning and preparation of diet in following ailments diarrhoea- low fibre diet, constipation -high fibre diet, typhoid and tuberculosis

SEMESTER V

Theory: Major 8 - Food Microbiology (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5.5	**V**	**806234**	**Food Microbiology**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

1,To Study Spoilage Dynamics
2.To Explore Industrial Fermentation
3.Introduce Food Preservation Principles

Course Outcome:

At the end of the course, students will be able to:

1Perform and interpret standard qualitative and quantitative microbial tests
2.Sanitation Verification:
3.Isolation & Identification**:** Utilizing selective and differential agar media

Unit	Content	Hrs	Weightage of Marks Allotted	Incorporation of Pedagogy
Unit-I	Brief history of food microbiology and introduction to important microorganisms in foods	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	Cultivation of microorganisms, Nutritional requirements of microorganisms ,types of media used, methods of isolation.	8		
Unit-III	Fundamentals of control of microorganism in foods :Extrinsic and intrinsic parameters affecting growth and survival of microbes, use of high and low temperature, dehydration, freezing, freeze-drying, irradiation	7		
Unit-IV	Food Spoilage: Contamination and microorganisms in the spoilage of different kinds of foods and such as cereal and cereal products, vegetable and fruits, fish and other sea foods, meat and meat products, eggs and poultry, milk and products, canned foods	8		

References:

1. Frazier WC and Westhoff D C and Vanitha NM (2017): Food Microbiology, 5th Ed. MaGraw Hill Education..
2. JayJM(2005):ModernFoodMicrobiology,3rdEd.CBSPublishers&Distributors.
3. PelczarM,ChanECS,KriegN(2009):Microbiology:ApplicationBasedApproach,Tata McGraw Hill Education.
4. Benson HJ(2001): Microbiological Applications: Complete Version: A Laboratory Manual in General Microbiology, 8th Ed. McGraw-Hill Publishing Co.
5. CollingCEandLynePM(1976):MicrobiologicalMethods,Butterworth.London.
6. BamrartG(2012):BasicfoodMicrobiology,2ndEd.(Reprint),Spinger.
7. WoodBJ(1998):MicrobiologyofFermentedFoods,VolI&II,2ndEd.Spinger.
8. TortoraGJ,FunkeBRandCaseCL(2016):Mocrobiology,11thEd.PearsonEducationIndia.

BlackJG(2008):Microbiology:PrinciplesandExplorations,7thEd.JohnWiley& Sons

Model Questions:

Long Type - 2 Questions
Short Type - 2 Questions

Practical - Food Microbiology (P)							
Level	**Semester**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/week**	**Exam Duration**	**Maximum marks**
5.5	**VI**	**806235**	**Food Microbiology**	**2**	**2**	**2Hrs**	**External-25 Marks** **Internal- 25 Marks**

Course Objectives:

1. To Utilize Selective and Differential Media:

2.To Execute Morphological Identification:

3.To Evaluate Environmental Hygiene**:**

Course outcome: At the end of the course, students will be able to:

1.Prepare and dilute solid and liquid food samples accurate

2.Prepare and homogenize diverse food samples

3.Identify and differentiate common food borne pathogens and spoilage organisms using biochemical tests

List of Practical in food Microbiology

1	1. Introduction to microbiology Use of equipment 2. Understanding and use of compound microscope 3. Use of Autoclave 4. Use of Incubator and Inoculation chamber
2	1. Microscopic identification of microorganisms (prepared slides): Bacterial, fungal strains 2. Preparation of liquid and solid media for culture of microorganisms.
3	1. Staining Techniques to study of Morphology of bacterial cells: 2. Simple staining with methylene blue, methyl violet, carbolfuschin, etc. 3. Differential staining with Gram stain technique
4	Microbiological techniques: Pure culture technique-Spread plate, Pour plate and Streak plate

Theory: Major 9 - Public Nutrition (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5.5	**V**	**806236**	**(T): Public Nutrition**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

1. To understand the need of prioritizing nutrition issues
2. To assess the nutritional and Health Status of an individual and the community.
3. To learn nutritional programmes and policies to overcome malnutrition
4. To understand various national and International nutritional organizations for combatingmalnutrition
5. To apply ICT in the formulation of community nutrition education programme

Course Outcome:

At the end of the course, students will able to:

1. Gaining knowledge on nutritional programmes and policies overcoming malnutrition
2. Understanding the national, international and voluntary nutritional organizations to combatmalnutrition organize community nutrition education programme with the application of computers

Unit	Content	Hrs	Weightage of Marks Allotted	Incorporation of Pedagogy
Unit-I	Concept and types of Community Concept of community nutrition	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	Assessment: Meaning, need, objectives and importance. on methods of nutritional assessment	8		
Unit-III	Elementary idea of health agencies - FAO, WHO, ICMR, ICDS, ICAR, CSIR, ANP, VHAI, NIN and CFTRI. Role of voluntary health organisation in the improvement of Community health.	7		
Unit-IV	Nutritional Intervention programmes to combat Malnutrition. Concept of food fortification and food enrichment. Nutrition Education: Definition, objectives of nutrition education. Methods of imparting nutrition education.	8		

References:

1. Park A. (2007), Park's *Textbook of Preventive and Social Medicine* XIX Edition M/SBanarasidas, Bharat Publishers, 1167, Prem Nagar, Jabalpur, 428 001(India)
2. Bamji M.S, Prahlad Rao N, Reddy V (2004*). Textbook of Human Nutrition* II Edition, Oxfordand PBH Publishing Co. Pvt. Ltd , New Delhi
3. Bhatt D.P (2008), *Health Education*, Khel Sahitya Kendra, New Delhi
4. Gibney MJ, Margetts BM, Kearney JM, Arab L (2004*) Public Health Nutrition* BlackwellPublishing Co. UK
5. Swaminathan M (2007), *Essentials of Food and Nutrition. An Advanced Textbook*Vol.I, TheBangalore Printing and Publishing Co. Ltd, Bangalore

	6. UNICEF. https://www.unicef.org/ 7. WHO.http://www.who.int/ 8. National Guidelines on Infant and Young Child Feeding. wcd.nic.in 9. WHO non-communicable diseases and risk factors. http://www.who.int/ncds/en/ 10. National Nutrition Mission – ICDS. icds-wcd.nic.in 11. Ministry of Health & Family Welfare, www.mohfw.nic.in 12. Field guide to designing communication strategy, WHO publication-2007 13. Communication for Development (C4D) Capability Development Framework, UNICEF and 3D Change, 2009
Model Questions:	Long Type - 2 Questions Short Type - 2 Questions

Theory: Major 10 - Food Quality Control (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5. 5	**V**	**806237**	**Food Quality Control**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

1. Explain the concepts of food quality
2. Understand causes of food spoilage and contamination
3. Learn national and international food laws

Course Outcome:

At the end of the course, students will able **t**o

1. Explain the principles of food safety management and food quality assurance system
2. Identify hazards and apply control measures open food contamination
3. Perform standard physical, chemical, and microbiological tests for food quality assessment

Unit	Content	Hrs	Weightage of Marks Allotted	Incorporation of Pedagogy
Unit-I	**Basics of food quality**: definition and Concept of food Quality, factors affecting food quality, raw materials, processing. storage, packaging	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	**Food Additives & Contaminants:** Classification and legal tolerances of preservatives, antioxidants, coloring agents, emulsifiers, and unintended chemical residues.	8		
Unit-III	**Sensory Physiology:** Mechanism of taste buds, olfaction, colour metrics, and tactile mouth feel characteristics. **Panel Selection & Criteria:** Setting up a standard sensory evaluation room; screening, training, and utilizing sensory panels.	7		
Unit-IV	**Prerequisite Programs (PRPs):** Good Manufacturing Practices (GMP), Good Hygienic Practices (GHP), and Sanitation Standard Operating Procedures (SSOP).	8		

References:

1. SrilakshmiB.(2018).Food Science. NewDelhi: New Age International.
2. RodayS.(1998).Food Hygiene and Sanitation 10thReprint. NewDelhi:Tata McGraw-Hill Education.
3. Chattopaday Ghosh S and BasuN.(2015).UcchaMadhaymikKhaddaOPusti, Calcutta Book House

Model Questions:

Long Type - 2 Questions
Short Type - 2 Questions

Theory: Major Elective(A) Food Adulteration (T)

Sem	Course Code	Course Name	Credits	Teaching Hours/ Week	Exam Duration	Max Marks
V	806238 A	Food Adulteration	2	2	2Hrs	External-30 Mark Internal- 20 Mark

Course Objectives:

1. Its scope is to help and gain knowledge on food adulterants in food commodities.
2. To understand certain skills of detecting adulteration of common foods.

Course Outcome:

At the end of the course, students will be able to:

1. Gain knowledge kinds of adulteration,detection and remedies
2. Learn basic laws and procedures regarding food adulteration and consumer protection

Unit	Content	Hrs	Weightage of Marks Allotted	Incorporation of Pedagogy
Unit-I	Common Foods and Adulteration A. Definition – Types; Poisonous substances, foreign matter,Cheap substitutes, Spoiled parts. Adulteration through Food Additives – Intentional and incidental. General Impact onHuman Health.	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	Adulteration of Common Foods and Methods of Detection A. Means of Adulteration Methods of Detection of Adulterants in the following Foods; Milk, Oil, Grain, Sugar, Spices and condiments, processed food, Fruits and vegetables. Additives and Sweetening agents (at least three methods of detection for each food item).	8		
Unit-III	Role of voluntary agencies such as, Agmark, I.S.I., Quality-control laboratories ofcompanies, Private testing laboratories, Quality control laboratories of consumer co- operatives.	7		
Unit-IV	Consumer education, Consumer's problems rights and responsibilities, COPRA 2019 - Offenses and Penalties – Procedures to Complain – Compensation to Victims.	8		

References:

1. A firstcourseinFoodAnalysis–A.Y.Sathe,NewAgeInternational(P)Ltd.1999.
2. Food Safety,case studies–Ramesh.V.Bhat,NIN, 1992.
3. https://old.fssai.gov.in/Portals/0/Pdf/Draft_Manuals/Beverages and confectionary. pdf.
4. https://cbseportal.com/project/Download-CBSE-XII-Chemistry-Project
5. FoodAdulteration#gsc.tab=0 (Downloadable e material on food adulteration).
6. https://www.fssai.gov.in/.
7. https://indianlegalsolution.com/laws-on-food-adulteration/
8. https://fssai.gov.in/dart

Model Questions:

Long Type - 2 Questions
Short Type - 2 Questions

Practical - Major Elective (A) Food Adulteration (P)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/week**	**Exam Duration**	**Maximum marks**
5. 5	**V**	**806239 A**	**Food Adulteration**	**2**	**2**	**2Hrs**	**External-25 Marks Internal- 25 Marks**

Course Objectives:

1. To Understand Food Standards**:** Familiarize students with national and international food safety standards (such as FSSAI, FDA, and Codex Alimentarius) regarding permissible limits and definition of adulteration.
2. To Master Qualitative Screening**:** Train students in executing rapid, cost-effective screening methods (physical, chemical, and visual) to detect intentional and incidental adulterants.
3. To Develop Analytical Equipment Skills:
4. To Cultivate Critical Thinking:

Course outcome: At the end of the course, students will be able to:

1. Execute rapid screening tests across major food matrices (dairy, fats, oils, spices, and grains) independently and accurately.

2. Apply their knowledge to design simple awareness campaigns or public workshops demonstrating household food safety testing for the community.

List of Practical in Food Adulteration	
1	Detection of Added Water: Starch,
2	Detection of Argemone Oil in Edible Oils: Detection of Vanaspati (Hydrogenated Fat) in Ghee**:**
3	Detection of Brick Powder/Red Lead in Chili Powder:
4	Detection of Papaya Seeds in Black Pepper:
5	Detection of Sugar Solution/Invert Sugar in Honey:
6	Detection of Chalk Powder or Washing Soda in Sugar:

Theory: - Major Elective (B) Food Packaging (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5. 5	**V**	**806240 B**	**Elective Food Packaging**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

1. To Understand Material Properties
2. To Master Preservation Mechanisms:
3. To Evaluate Food-Package Interactions

Course Outcome:

At the end of the course, students will be able to:

1. Evaluate and select the most technically and economically viable packaging material for a specific food category based on its respiratory or chemical vulnerability.

2.Calculate and predict the shelf-life of packaged foods by evaluating material transmission rates

Unit	Content	Hrs	Weightage of Marks Allotted	Incorporation of Pedagogy
Unit-I	Introduction to Food Packaging 1. Definition, functions, and importance of packaging 2. History and evolution of food packaging 3. Requirements of a good packaging system 4. Packaging laws and regulations in India – FSSAI, BIS, CODEX aa3a	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	Packaging Materials 1. Types of packaging materials: paper, glass, metals, plastics, laminates 2. Properties, advantages, and limitations of each material 3. Ancillary packaging materials – labels, adhesives, caps, closures 4. Selection of packaging material based on food type aa3a	8		
Unit-III	Packaging Techniques 1. Conventional methods: bottling, canning, pouching 2. Advanced techniques: vacuum packaging, MAP, aseptic packaging 3. Smart and intelligent packaging – indicators, sensors, RFID 4. Specialty packaging methods aa3a	7		
Unit-IV	Packaging Design & Testing 1. Principles of packaging design 2. Testing methods for packaging materials – strength, permeability, seal integrity 3. Impact of packaging on food safety and shelf life 4. Labelling requirements and CODEX food labelling standards aa3a	8		

References:

1. **Salgado, P. R., Di Giorgio, L., Musso, Y. S., & Mauri, A. N. (2021).** Recent developments in smart food packaging focused on biobased and biodegradable polymers. *Frontiers in Sustainable Food Systems*, *5*. https://doi.org/10.3389/fsufs.2021.630393
2. **Martins, J. C. L. (2026).** A critical review of emerging solutions for food packaging: Opportunities and challenges. *Foods*, *15*(5), 920
3. **Palanisamy, Y., Kadirvel, V., & Ganesan, N. D. (2025).** Recent technological advances in food packaging: sensors, automation, and application. *Sustainable Food Technology*, *3*, 161-180. https://doi.org/10.1039/d4fb00296b

Model Questions:

Long Type - 2 Questions
Short Type - 2 Questions

Practical - Major Elective (B) Food Packaging (P)							
Level	**Semester**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/week**	**Exam Duration**	**Maximum marks**
5. 5	**V**	**806241 B**	**Food Packaging**	**2**	**2**	**2Hrs**	**External-25 Marks** **Internal- 25 Marks**

Course Objectives:

1. To Assess Mechanical Strength
2. To Evaluate Thermal and Seal Integrity:
3. To Test for Chemical Migration

Course outcome: At the end of the course, students will be able to:

1. Operate standard food packaging testing equipment
2. Identify and differentiate unknown polymer films
3. Execute structural and destructive tests on commercial packages to diagnose package failures,

List of Practical in Food Packaging

1	Identification of different packaging materials
2	Testing of packaging materials for strength, thickness, permeability
3	Packaging of fruits, vegetables, bakery, and dairy products
4	Label design as per FSSAI guidelines
5	Shelf-life study of packaged foods

SEMESTER VI

Theory: Major 11 - Bakery Science (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5.5	**VI**	**806247**	**Bakery Science**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

1. Deconstruct Ingredient Functionality:

2. Master Biological and Chemical Leavening:

3.Analyze Physical Transformations:

4.Optimize Product Quality and Shelf-Life:

Course Outcome:

At the end of the course, students will be able to:

1. Calculate and adjust formulas using Baker's Percentages (where flour is always 100%)
2. To scale recipes flawlessly.
3. Select specific flours based on analytical metrics
4. Diagnose structural crumb failures
5. Evaluate sensory attributes

Unit	**Content**	**Hrs**	**Weightage of Marks Allotted**	**Incorporation of Pedagogy**
Unit-I	• Introduction and scope of bakery science. • Common bakery terms	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	• Flours: Constituents of flour, water absorption power, gluten, grades of flour. • Raw materials required for bread and cake making	8		
Unit-III	• Role of flour, water, yeast, salt, sugar, milk and fats in bakery. • Bread and cake making process.	7		
Unit-IV	• Bread improver. • Knowledge of oven and baking temperatures. • *Bakery Process and Equipment.* • Product characteristics, common bakery faults and corrective measures. • Bakery equipment-types, selection, operations and maintenance.	8		

References:

1. DubeyS.C(2007) *BasicBaking-Scienceand Craft*. SocietyofIndianBakers, Delhi.
2. KingsleeJohnJ.(2019).*Professionaltextbooktobakeryandconfectionery*.(2nded).Delhi:NewAge International (P) Ltd
3. RainaUetal.(2010).*Basicfoodpreparation-acompletemanual*.(4thed). Delhi:OrientBlackswan
4. YogambalAK.(2012).*Textbookofbakingandconfectionery*.(2nded).Delhi: PHI
5. Matz.A.(1998)*Bakery TechnologyandEngineering*,Delhi,CBS Publishers.

Model Questions:

Long Type - 2 Questions
Short Type - 2 Questions

Practical - Bakery Science (P)							
Level	**Semester**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/week**	**Exam Duration**	**Maximum marks**
5.5	**VI**	**806248**	Ba**kery Science**	**2**	**2**	**2Hrs**	**External- 25 Marks Internal- 25 Marks**

Course Objectives:

1. To learn how to execute a standard "control" recipe perfectly
2. To gain hands-on proficiency with specialized diagnostic tools used in commercial quality control.
3. To train the baker's hands to recognize physical changes in dough elasticity, extensibility, and viscosity during mixing and fermentation.

Course outcome: At the end of the course, students will be able to:

1. Successfully isolate a wet gluten ball to visually compare the quantity and elasticity of different wheat varieties.
2. By baking biscuits with varying ratios of baking soda (sodium bicarbonate) versus baking powder,
3. Learn to identify chemical imbalances via crumb color (yellowing from high pH) and soapy flavor defects.

List of Practical in Bakery Science	
1	Practical training in baking of: • Cream cake
2	• Sponge cake preparations • Short crust pastry
3	Breads, buns
4	dinner rolls and pizza base
5	Biscuits and cookies

Theory: Major 12 - Nutritional Biochemistry (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5. 5	**VI**	**806249**	**Nutritional Biochemistry**	**2**	**2**	**2Hrs**	**External-30 Mark** **Internal- 20 Mark**

Course Objectives:

1. Understand the biochemical basis of Nutrition

2. Explain the chemistry, Digestion, Absorption and Transport

3. Apply knowledge of Nutritional Biochemistry

Course Outcome:

At the end of the course, students will be able to

1. Develop an understanding of the principles of Biochemistry as applicable to Human Nutrition
2. Obtain an insight in to the Biochemistry of digestion and absorption of major nutrients
3. Apply the acquired knowledge in Human Nutrition and Dietetics.

Unit	**Content**	**Hrs**	**Weightage of Marks Allotted**	**Incorporation of Pedagogy**
Unit-I	Carbohydrates Digestion, Absorption &Transport-Basic Concept Metabolism Lipid Digestion, Absorption &Transport-Basic Concept	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	Proteins Digestion, Absorption &Transport-Basic Concept Metabolism	8		
Unit-III	Energy Metabolism Unit of energy Basal Metabolic rate Determination of total Basal Metabolic rate Determination of Energy , Factors affecting total Energy requirement	7		
Unit-IV	Nucleic Acid & Enzymes Nucleic Acid Nucleic Acid Structure of DNA Structure& Functions of RNA Role of DNA & RNA in protein synthesis Enzymes Definition, Nomenclature Classification	8		

References:

1. PotternN.andHotchkiss,J.H.(1996),FoodScience;C.B.S.Publishersanddistributers,NewDelhi.
2. DuckWorth,R.B.(1978),WaterRetensiontoFoods,AcademicPress,London.
3. Peckham,G.G.(1969);FoundationofFoodPreparation,McMillanCo.
4. Fox B.A.andCameron,A.G.;FoodScienceandChemicalApproach;UniversityofLondon,1970.
5. Kraner,A.andTwingB.A.; FundamentalsofQualityControl for foodindustry, TheAVIPublishing Co,1966.
6. C.Gopalan,B.V.RamaSastri,S.C.Balasubramanian(2004),NutritiveValueofIndian Foods, National Institute of Nutrition, ICMR, Hyderabad

Model Questions:	Long Type - 2 Questions Short Type - 2 Questions

Theory: Major 13 - Startup and Skills Development in Food and Nutrition (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/Week**	**Exam Duration**	**Max Marks**
5.5	**VI**	**806250**	**Startup and Skills Development in Food and Nutrition**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

- To impart concepts of menu planning, purchasing, receiving, storage, food production, space and equipment.
- To develop concept of financial and personnel management.
- To enable students to develop project plan to open a food service unit.

Course Outcome:

At the end of the course, students will be able to

- Describe the origin and kinds of food service units.
- Discuss importance and types of menu and factors affecting menu planning.
- Understand basic principles of organization and management
- Plan for a small food service unit.

Unit	Content	Hrs	Weightage of Marks Allotted	Incorporation of Pedagogy
Unit-I	Concept, definition, characteristics of entrepreneurship 2. Role of entrepreneurship in food sector and economy 3. Types of entrepreneurs and enterprises – MSME, startups, SHGs 4. Government schemes for food entrepreneurs: PMFME, FSSAI, Mudra, Startup India	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	Menu Planning • Importance of menu • Factors affecting menu planning • Types of menu	8		
Unit-III	Organization and Management • Principles of management • Functions of manager	7		
Unit-IV	Food Production Process • Food purchasing and receiving Storage • Quantity food production-standardization of recipes, recipe adjustments and portion control, quantity food production techniques • Equipment-factors affecting selection of equipment • Importance of financial management	8		

References:

1. 1.SethiMohini.(2016).*InstitutionalFoodManagement*.2nded.Delhi.NewAgeInternational (P)Ltd. Chapter 6, 10, 21,22,25; pg 99-129, 166-176, 371-421, 467-476
2. .IGNOU(2017)MFN007*EnterpreneurshipandfoodserviceManagement*,Delhi.Chapter2-3,pg45-85.
3. .RodayS. (2003).*FoodHygiene&Sanitation*.Noida: TataMcGraw Hill PublicationLtd.
4. .SaxenaR.P.(2010).*FoodServiceand CateringManagement*.Delhi: AnmolPublicationsPvtLtd.
5. 5.TanejaSandGuptaS.L. (2001).*EntrepreneurshipDevelopment*.Delhi: Galgotia Publishing.

Model Questions:

Long Type - 2 Questions
Short Type - 2 Questions

Theory: Major Elective (A) Food Preservation (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/ Week**	**Exam Duration**	**Max Marks**
5.5	**VI**	**806251 (A)**	**Food Preservation**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:

1. To learn the principles behind the methods of preservations
2. To understand the stages of cookery and chemical characteristics in the preservation of fruitsand vegetables
3. To formulate preserved food products
4. To acquire skills to preserve different types of food items based on their perish ability

Course Outcome:

1. At the end of the course, students will be able to:
2. Know the principles of preservation behind the methods of preservation
3. Understand the stages of sugar cookery, quality of pectin and acidity in the development ofpreserved food products
4. Acquire skills to formulate food-based products
5. Explore the principles of preservation in fruits and vegetables-based products
6. Skills to prepare cereals and pulse based preserved products and develop new products withretention of quality.

Unit	Content	Hrs	Weightage of Marks Allotted	Incorporation of Pedagogy
Unit-I	Food preservation: definition, objectives and principles of food preservation	7		Demonstration, Class room study • Self-study • Experiential learning • Assignment designing • Participative learning
Unit-II	Preserved Products: Jam, Jelly, Marmalade, Sauces types, composition and manufacture, selection, cost, storage, uses and nutritional aspects	8		
Unit-III	Pickles, Squashes, Syrups-types, composition and manufacture, selection, cost, storage, uses and nutritional aspects	7		
Unit-IV	Different methods of food preservation and processing	8		

References:

1.Subalakshmi,GandUdipi,SA(2006):Foodprocessingandpreservation,1stEd.NewAge International (P)Ltd.

2.SrilakshmiB(2018):FoodScience,7thColourEd.NewAgeInternational(P)Lt

3. PotterNNandHotchkissJH(1999):Foodscience,5thEd,Spinger

4. SrivastavaRPOandKumarS(2014):FruitandVegetablePreservationPrinciplesand Practices, 3rd Ed. International Book distribution Company.

5.McWilliamsMandPaineH(1984):ModernFoodpreservation.SurjeetPublions
6.CruessWV(2004):Commercial Fruits and Vegetable Products, Agrobios India.
7.Desrosier NW and Desrosier JN(2006):The Technology Of Food Preservation, 4th Ed. CBSPublishers and Distributors, New Delhi.
8.AdamsMandNoutMJR(2001):FermentationandFoodSafety,Spinger

9.Srivastava R.P. (2012),*Fruit and vegetable preservation – Principles and Practices*, International Book Distributing Co., (IBDC), New Delhi.

	10. Maria Parloa (2009), *canned fruit, preserves and jellies: Household methods ofpreparation*, US Department of Agriculture, Washington. 11. Shafiur, Rahman, M. (2007), *Handbook of Food Preservation*, 2nd edition, CRC press, New Delhi.
Model Questions:	Long Type - 2 Questions Short Type - 2 Questions

Practical – Food Preservation (P)							
Level	**Semester**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/week**	**Exam Duration**	**Maximum marks**
5. 5	**VI**	**806252 (A)**	**Food Preservation**	**2**	**2**	**2Hrs**	**External-25 Marks Internal- 25 Marks**

Course Objectives:

1. To focus on executing simple methods properly to ensure food safety and minimize waste.
2. To practice strict sanitization protocols for jars, lids, and cutting surfaces to eliminate batch contamination.
3. To practice Maximize Resource Efficiency

Course outcome: At the end of the course, students will be able to:

1. Blanch and freeze vegetables properly.
2. Execute safe boiling-water canning.
3. Dehydrate food uniformly without case hardening.
4. Minimize freezer burn.

List of Practical in Techniques of Food Preservation

1	Different methods of Food preservation–Drying, Freezing, Frying, canning, bottling etc.
2	Aseptic handling: Sources of contamination of foods. Preparation of pickles, tomato sauce, chili sauce, jelly, tomato puree, squashes etc
3	Visit to Commercial Pickle Manufacturing Food Industry

Theory: Major Elective (B) Food Chemistry (T)							
Level	**Sem**	**Course Code**	**Course Name**	**Credits**	**Teaching Hours/Week**	**Exam Duration**	**Max Marks**
5.5	**VI**	**806253 (B)**	**Food Chemistry**	**2**	**2**	**2Hrs**	**External-30 Mark Internal- 20 Mark**

Course Objectives:
1. Understand food composition.
2. Understand chemistry of food

Course Outcome: At the end of the course, students will
1. Gain knowledge of food composition
2. Students understood chemistry of food

Unit	**Content**	**Hrs**	**Weightage of Marks Allotted**	**Incorporation of Pedagogy**
Unit-I	Definition of Food Nutrients: Food Composition - Nutrients: Macro Nutrient, Micro Nutrient Chemistry of Carbohydrates- Monosaccharide, polysaccharides, disaccharides Proteins -Simple proteins, conjugated proteins and derived proteins.	7		Demonstration, Class room study ● Self-study ● Experiential learning ● Assignment designing ● Participative learning
Unit-II	Chemistry of Vitamins: (in brief) Lipids - Simple lipids, compound lipids. Water Soluble Vitamins- Vitamin C, Thiamine, Riboflavin, Niacin, Pyridoxine, Vit.B12, Folic Acid Fat Soluble Vitamins -Vitamin A, Vitamin D, Vitamin E and Vitamin K	8		
Unit-III	Chemistry of Minerals: (in brief) Minerals: Calcium, Phosphorous, Sulphur, Potassium, Chlorine, Sodium and Magnesium. Trace Elements: Iron, fluorine, zinc, copper, iodine, chromium and cobalt	7		
Unit-IV	Chemistry of non-nutrients: Water-pH, turbidity, hardness, dissolved gases. Fibre.	8		

References:

1. Potter, N., & Hotchkiss, J. H. (1996). *Food science*. C.B.S. Publishers and Distributors.
2. Duckworth, R. B. (1978). *Water retention in foods*. Academic Press.
3. Peckham, G. G. (1969). *Foundations of food preparation*. Macmillan Co.
4. Fox, B. A., & Cameron, A. G. (1970). *Food science: A chemical approach*. University of London Press.
5. Kramer, A., & Twigg, B. A. (1966). *Fundamentals of quality control for the food industry*. The AVI Publishing Co.
6. Gopalan, C., Rama Sastri, B. V., & Balasubramanian, S. C. (2004). *Nutritive value of Indian foods*. National Institute of Nutrition, Indian Council of Medical Research.

Model Questions:

Long Type - 2 Questions
Short Type - 2 Questions

Major Elective Practical B : Food Chemistry

Level	Semester	Course code	Course Name	Credits	Teaching Hours/ week	Exam Duration	Maximum marks
5.5	**VI**	**806254 (B)**	**Food Chemistry**	**1**	**2**	**2Hrs**	**External-25 Marks Internal- 25 Marks**

Course Objectives:

1. Understand food composition.
2. Understand chemistry of food

Course Outcome: At the end of the course ,students will

1. Understand food composition.
2. Understand chemistry of food

-List of Practical in Minor Elective B : Food Chemistry (P) 806220

1	Detection of carbohydrates in a given sample - Molish test
2	Estimation of the concentration of reducing sugar -Benedict's Test.
3	Demonstration of breakdown of starch to monosaccharide with Hydrochloric acid.
4	Detection of proteins using colour reactions. Burette test Xanthoproteic test Million's test
5	Detection of fats using- Solubility Test Emulsification Bromine Water Test Saponification
6	Detection of iodine from salt
7	Estimation of Vitamin C in a given sample
8	Estimation of Iron in a given sample.