



**SEVA MANDAL EDUCATION SOCIETY'S
Dr. BHANUBEN MAHENDRA NANAVATI COLLEGE OF HOME SCIENCE
(Autonomous)**

NAAC Re-accredited 'A+' Grade with CGPA 3.69/4 (3rd Cycle)

UGC Status: College with Potential for Excellence

**BEST COLLEGE AWARD 2016-17 adjudged BY S.N.D.T. Women's University
338, R.A Kidwai Road, Matunga, Mumbai 400019**

Syllabus – 4th Semester Academic year- 2020-2021

**Department of Food Science and Nutrition
& Nutrition and Dietetics**

(UG)



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STRUCTURE

SYBSC- Food Science and Nutrition SEMESTER 4 (Structure and Weightage)						
Course and Code	Total Credits	Th C	Pr C	Int	Ext	Total
FSN401 Advance Chemistry	4	2	2	50	50	100
FSN402 Human Nutrition	4	4	-	50	50	100
FSN403 Food Microbiology	4	2	2	50	50	100
FSN404 Food Preservation	4	3	1	50	50	100
FSN405 Food Analysis	4	-	4	50	50	100
TOTAL	20	11	9	250	250	500

STRUCTURE

SYBSC- Nutrition and Dietetics SEMESTER 4 (Structure and Weightage)						
Course and Code	Total Credits	Th C	Pr C	Int	Ext	Total
ND401 Advance Chemistry	4	2	2	50	50	100
ND402 Human Nutrition I	4	4	-	50	50	100
ND403 Food Microbiology	4	2	2	50	50	100
ND404 Medical Nutrition Therapy I	4	2	2	50	50	100
ND405 Introduction to Hospital administration	4	2	2	50	50	100
TOTAL	20	12	8	250	250	500

***Note- Syllabus of Advance Chemistry, Food Microbiology and Human Nutrition are common to both specializations**

CONTENTS

Sr. No	Name of The Subject	Page Number
1.	FSN401 Advance Chemistry	5
2.	FSN402 Human Nutrition	9
3.	FSN403 Food Microbiology	13
4.	FSN404 Food Preservation	18
5.	FSN405 Food Analysis	21
6.	ND404 Medical Nutrition Therapy I	24
7.	ND405 Introduction to Hospital administration	29

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PROGRAMME: B.Sc. in Home Science/ BCA

Department of Food Science and Nutrition

Semester IV

Advanced Chemistry

(Offered to students specializing in Food Science and Nutrition and Nutrition and Dietetics)

Course Description-

This course contains basic concepts related to Carbohydrates, Proteins and Lipids and a unit on Nucleic acids. The course is designed to help students Understand the fundamentals of macronutrients and their metabolism.

Learning outcome-The course will enable students to:

- Lay the foundation of biological chemistry necessary for learning Biochemistry.
- Give insights about how chemical reactions occur in biological systems.
- know the structures of the principal components- Carbohydrates, Proteins and Lipids present in biological systems and their metabolism.

Code	Course	TC	Th	PR	Int	Ext	Total
FSN401 And ND401	Advanced Chemistry	4	2	2	50	50	100

Advanced Chemistry Theory

Module No	Objectives	Content	Evaluation
1	<p>This module will enable students to:</p> <ol style="list-style-type: none"> 1) Understand the fundamentals of carbohydrates and their importance in metabolism. 2) Understand the importance of lipids and their role in biological systems. 	<p>Carbohydrates:</p> <ul style="list-style-type: none"> ● General formula, Classification, Structure, properties and uses of monosaccharides (Glucose, Fructose), disaccharides (Lactose, Maltose and Sucrose), oligosaccharides, and polysaccharides (Starch, Glycogen). ● Introduction to the structure of D & L forms. Optical and stereo isomers. Anomers. Cyclic forms of monosaccharides of glucose and fructose including structures. ● Reactions of Monosaccharides- Oxidation and reduction reactions, esterification reaction, osazone formation <p>Lipids:</p> <ul style="list-style-type: none"> ● Definition and Introduction, Structural formula and difference between saturated and unsaturated fatty acids, ● Chemical Constants of fats-iodine value, saponification value, acid value and Richert-Miesel numbers. ● Rancidity <p>Sterols-Structure and function of cholesterol, 7 dehydro- cholesterol and ergosterol.</p>	25 Marks Assignments Quiz
2	<ol style="list-style-type: none"> 1) Understand the fundamentals of proteins and nucleic acid chemistry. 2) Know the role of enzymes and factors that affect enzyme actions. 	<p>Proteins:</p> <ul style="list-style-type: none"> ● Classification of amino acids with structure. ● Zwitter ionic form. ● Peptide bond. ● Structure of proteins (primary, secondary, tertiary and quaternary structure. ● Denaturation of proteins. ● Salting out of proteins and isoelectric precipitation. <p>Nucleic Acid Structure: Enzymes: Definition, general properties, Nomenclature, classifications and specificity.</p> <ul style="list-style-type: none"> ● Mechanism of enzyme action. ● Factors affecting enzyme activity. ● Enzyme inhibition-competitive and non competitive. <p>Coenzymes and isoenzymes and their role in metabolism.</p>	25 Marks Assignments Quiz

Advanced Chemistry Practical

OBJECTIVES:

The course will enable students to:

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

Module No	Objectives	Content	Evaluation
1	This module will enable students to: Apply the basic knowledge of chemical reactions.	Preparations of basic solutions for titration: 1. Preparation of standard solution of NaOH and H ₂ SO ₄ (Strength of 1N – 0.1N or 0.25N or 0.5N etc.), Calculations for normality, morality and g/l concentration. 2. Oxidation reduction titration- A) Ferrous ammonium sulphate with K ₂ Cr ₂ O ₇ B) KMnO ₄ with oxalic acid. Using a standard solution of KMnO ₄ and Na OH determine the strength of a mixture of H ₂ SO ₄ and H ₂ C ₂ O ₄ . 2H ₂ O.	25 Marks Practical test
2	This module will enable students to: Apply theoretical knowledge of carbohydrate, proteins and lipid chemistry.	1. Qualitative analysis of carbohydrates, Glucose, fructose, sucrose, lactose, maltose, starch. 2. Estimation of glucose by DNSA (colorimetric method) 3. Estimation of sucrose using Benedict's Quantitative method. 4. Qualitative tests for proteins (colour reactions and precipitation reactions) Qualitative tests for fats.	25 Marks Practical test

Evaluation	Details	Marks
Internal	25 [Th] exam (Twice)	25 + 25 = 50Marks
External	Final exam	50 marks
	Total marks	100 Marks

References:

- 1) Finar I.L. "Organic Chemistry Vol. I" 6th Edition, (2009), Pearson Education India.
- 2) Finar I.L. "Organic Chemistry, Volume 2": Stereochemistry and the Chemistry of Natural Products, 5th Edition, 2009.
- 3) Rastogi S.C. "Biochemistry", 2nd Edition, (2003) Tata McGraw Hill Publishing Co. Ltd.
- 4) Jain, J, L., S. Jain and N. Jain. "Fundamentals of Biochemistry". 6th Edition, (2005). S.Chand Company Ltd.
- 5) Plummer, D.T., "An Introduction to Practical Biochemistry". 2nd Edition, (1971) McGraw-Hill Publishing Co. Ltd.
- 6) Apps D.K. and Cohen B.B. and Steel C.M. "Biochemistry: A Concise Text for Medical Students" (1992), Bailliere Tindall,
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- 14) Berg J.M. Tymoczko J.L., and Stryer. L. "Biochemistry", 5th edition, (2002). W.H. Freeman.
- 15) Mendham J., RC Denney - Vogel's textbook of quantitative chemical analysis – Pearson education ltd.
- 16) Textbook of practical Chemistry Std. 11 Gujarat and Maharashtra secondary education Board.

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PROGRAMME: B.Sc. in Home Science/ BCA

Department of Food science and Nutrition

Semester -IV

Course Title: Human Nutrition I

(Offered to students specializing in Food Science and Nutrition and Nutrition and Dietetics)

Course Description: This course is designed to impart knowledge pertaining to physiological processes of digestion, absorption and transport of macronutrients. It will also help in understanding the functions of carbohydrates, proteins, fats and water. This course will help the students to understand the implications of deficiencies and excess of nutrients, energy metabolism and water and electrolyte as well as acid base balance.

Course outcome: After undertaking this course,

The students will be able to classify various nutrients and know which scientist discovered them. They will also be able to name different equipment used for direct and indirect calorimetry, and explain the process of energy metabolism. They will define the macronutrients, list their functions, identify the effect of excess and deficiency of the same on human health and relate the role of various organs of the digestive system in the digestion, absorption and metabolism of the macronutrients. This course will help the students to categorize the cations and anions present in ECF and ICF and will be able to discuss their role in maintaining the water and electrolyte balance.

Course Objectives: This course will enable students to:

1. To explain the physiological process of digestion and absorption of nutrients.
2. To summarize the functions of various macro nutrients and water.
3. To interpret the implications of deficiencies and excess of the nutrients.
4. To develop an understanding of how electrolytes and fluid balance are maintained in the human body.

Code	Subject	Total Credits	Th	Pr	Int	Ext	Total
FSN402	Human Nutrition I	4	4	-	50	50	100

Modules	Objectives	Content	Evaluation
Module 1 Nutrients Unit 1. History of Nutrients Unit2. Physiology of digestive system	This module will enable students to: Know the various scientists and developments in nutrition science. To list the various organs of the gastrointestinal tract To discuss the role of each organ in the process of human digestion and absorption To explain the role of enzymes, present in the digestive juices To explain the process of active and passive absorption and through the diffusion	Eminent Scientists and developments in Nutrition Science, discoveries of various nutrients, experiments carried out during the discoveries of nutrients, various energy balance studies, direct and indirect calorimetry, forms of energy, measurement of energy, SDA, thermogenesis, BMR estimation of BMR and factors affecting BMR Human digestive system- the process of digestion and absorption of macronutrients- Transport across cell membrane – active, passive, diffusion Introduction on the concept of Gut Health – In Brief	10 Marks Assignments (5marks-content & 5-presentation)

Modules	Objectives	Content	Evaluation
Module 2. Unit 1. Carbohydrates	This module will enable the students to: To classify the carbohydrates To list the important functions of carbohydrates To name the sources of carbohydrates To determine the effects of deficiencies and excess of carbohydrates in the body.	Sources and classification of carbohydrates Functions of carbohydrates Hormonal control of blood glucose levels Concept of glycemic index and glycemic load Types, properties and functions of fiber Role of fiber in management of obesity, diabetes, hypercholesterolemia, colon cancer and constipation. Computation of RDA, effects of excess and deficiency of carbohydrates	10 Marks quiz

Unit2 Proteins	This unit will enable students to: Classify the proteins & to name the sources of proteins List the important functions of proteins Select methods for evaluating the quality of proteins Explain the effect of amino acid imbalance, antagonism and toxicity List down the factors affecting protein utilization Define vegetarianism Identify the clinical and biochemical signs and symptoms of PEM.	Sources and nutritional & biochemical classification of proteins Functions of proteins Methods for evaluation of protein quality Amino acid imbalance, nitrogen balance, antagonism and toxicity. Factors affecting protein utilization and RDA. Vegetarianism PEM - clinical and biochemical aspects.	10 Marks quiz
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Modules	Objectives	Content	Evaluation
3 Lipids	This module will enable the students to <ul style="list-style-type: none"> ● Relate the role of lipids in nutrition and health ● List the different types of lipids in the diet and the body ● Distinguish between good and bad lipids ● Discuss the role of fat in atherosclerosis ● Relate the metabolism of carbohydrates, fats and proteins during starvation and excess of the same 	Sources and classification of lipids Saturated and unsaturated fatty acids, functions of essential fatty acids Functions and metabolism of lipids Hydrogenation, Cis and Trans fats Role of fat in cardio-vascular diseases. RDA Inter relation between carbohydrate, fat and protein in energy metabolism. Starvation, excess of macronutrient.	10 Marks quiz

Modules	Objectives	Content	Evaluation
4 Unit 1: Water & electrolyte balance Unit 2: Acid-Base Balance	This module will enable the students to Explain the inter-relationship between water and electrolytes and their role in maintenance of fluid balance Summarize the changes that take place in the body due to fluid imbalance <ul style="list-style-type: none"> Relate the role of lungs and kidneys in maintaining the acid-base balance 	Body fluids, ICF,ECF, total body water, cations and anions present in ICF & ECF Sources, functions and distribution, deficiencies of Water and Electrolytes- Sodium, Potassium and Chloride- Mechanisms of water balance- role of kidneys, aldosterone, renin angiotensin system and thirst mechanism Electrolyte balance, dehydration and water intoxication. Acids and base present in the body, H ⁺ & HCO ₃ ⁻ ions, respiratory and renal control of acid-base balance	10 Marks quiz

EVALUATION:

Evaluation	Details	Marks
Internal	25 [Th] exam (Twice)	25 + 25 = 50Marks
External	Final exam	50 marks
	Total marks	100 Marks

References

- Nutrition and dietetics: practice and future trends / Winterfeldt, Esther A. ; Bogle, Margaret L.5th ed. - Burlington : John and Bartlett Learning , (2018)
- Kane, Kelly & Prelack, Kathy: Advanced medical nutrition therapy. Burlington. Jones and Bartlett Learning, 2019. 978-1-284-04263-4 (615.854KAN/PRE)
- Medeiros, Denis M. & Wildman, Robert E. C.: Advanced human nutrition. (4th ed.) Burlington. Jones & Bartlett Learning, 2019. 978-1-284-12306-7 (612.3MED/WIL)
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- Bamji M.S., Rao N.P., Reddy V., (2003) Textbook of Human Nutrition, Oxford and IBH Publishing co. Ltd., New Delhi.
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- Guthrie H. (1986) Introductory Nutrition, Times Mirror College Publication, Toronto, Canada.
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**PROGRAMME: B.Sc. in Home Science
Department of Food Science and Nutrition
Semester IV**

Course Title: Food Microbiology

(Offered to students specializing in Food Science and Nutrition and Nutrition and Dietetics)

Course Description:

Illustrate the role of microorganisms in food safety

Cultivate and enumerate microorganisms from various food samples.

Compare various physical and chemical methods used in the control of microorganism

Objectives

The course enables the students to-

To understand the nature and the role of microorganisms in food.

To have a knowledge of the basic principles of food sanitation and safety.

To acquire a perspective of the importance of microorganisms in environmental microbiology.

Learning Outcomes: Student will be able to

- Recall the important microorganisms in food and Identify the microorganisms found in food,
- Explain the factors that affect microbial growth in food,
- Discuss microbial spoilage of food,
- List foodborne diseases and Differentiate between foodborne infection and intoxication
- Practice the methods for microbial examination for food
- Identify the importance and properties of indicator organisms.
- Explain the principle of quality control
- Discuss the role of HACCP in food safety.

Code No.	Subject	TC	Th	Pr	Int	Ext	Total
FSN403	Food Microbiology	4	2	2	50	50	100

Food Microbiology Theory

Module No	Objectives	Content	Evaluation
1	<p>This module will enable the students to :</p> <ol style="list-style-type: none"> 1. To be acquainted with microorganisms important in food 2. To understand their characteristics in relation to preservation and spoilage of food 3. To have a knowledge of the various sources of contamination 	<p>Food Microbiology –Basic concepts and History in brief</p> <p>General characteristics</p> <ul style="list-style-type: none"> ● Morphological Characteristics ● Reproductive characteristics ● Physiological characteristics ● Molds of industrial importance <p>Molds, Yeasts and Bacteria</p> <p>Brief introduction to the following: Viruses, Algae and Parasites</p> <p>Sources And Types of Contamination Water</p> <ul style="list-style-type: none"> ● Microbial flora-(types of microorganisms) ● Water -As a source of contamination ● Water purification ● Microbial examination ● Indicator organisms ● Water borne illnesses- (names) ● Microbial flora ● Sources of contamination <p>Other Sources of contamination</p> <ul style="list-style-type: none"> ● Humans, Pests, Animals, Birds and Inanimate objects <p>Food safety Basic concepts of Physical, Chemical and Biological hazards associated with foods.</p> <p>Sanitation in Food Service</p> <p>Establishment</p> <ol style="list-style-type: none"> 1 Cleansing agents, Disinfectants & sanitizers used in Food service Establishment. 2 Personal hygiene <ul style="list-style-type: none"> ● The food handler ● Cleanliness with regard to hand, habits, working attire/cloths, jewellery, ● Health of a food handler 3 HACCP Principles, Need and benefits 	<p>25 Marks Unit test</p> <p>25 Marks Unit test</p>

Module No	Objectives	Content	Evaluation
2	<p>This module will enable the students to :</p> <p>1. Food Spoilage and pathogenesis of Microorganisms</p>	<p>Microorganisms and Food: Microbial fermentation and role of microorganisms in Food fermentations</p> <ul style="list-style-type: none"> ● Beer, Wine, Bread ● Indian pickles ● Fermented dairy products - curd, yoghurt, cheese <p>2. Food Spoilage and Food Borne Diseases</p> <ul style="list-style-type: none"> ● Contamination and spoilage of cereals & cereal products. ● Contamination and spoilage of meat and meat products. ● Contamination and spoilage of milk and milk products. <p>Food Poisoning and Infections:</p> <p>Definitions and differentiation between:</p> <ul style="list-style-type: none"> ● Food poisoning and infections. ● Salmonella and Botulism ● E. coli and S. aureus 	<p>25 Marks</p> <p>Assignments / Presentations</p>

EVALUATION:

Evaluation	Details	Marks
Internal	<p>25 [Th] exam</p> <p>25 [Pr] = Project, quiz and assignments</p>	25 + 25 = 50Marks
External	Final exam	50 marks
	Total marks	100 Marks

References

1. Frazier, W. C. and Westhoff, D. 5th Edition (2013) Food Microbiology .Tata McGraw-Hill
2. Edward Farnworth , Handbook of fermented and functional foods. 2nd edition (2008)
3. Jay, .Modern food microbiology, 7th Edition (2005).Van Nostr and Reinhold Company, New York
4. Marriot. N.G. Principles of Food Sanitation .5th edition (2006)Edward Arnold
5. Pelczar, M. L. and R.D Reid (1998)Microbiology. McGraw &Hill, New York

Website links:

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2. <http://aggie-horticulture.tamu.edu/food-technology/food-processing-entrepreneurs/microbiology-of-food/>
3. <http://study.com/academy/lesson/bacterial-colony-morphology-characteristics-definition.html>
4. <http://www.dictionary.com/browse/morphological>
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6. <http://www.cliffsnotes.com/study-guides/biology/microbiology/microbial-cultivation-and-growth/growth-requirements-for-microorganisms>
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12. <http://faculty.weber.edu/coberg/class/3853/3853%20Molds%20of%20Importance.htm>
13. <http://www.fffca.org/content/moulds-food-production>
14. <http://www.fffca.org/content/yeasts-food-production>
15. <http://www.fffca.org/content/yeasts-food-production>
16. <http://www.fffca.org/content/bacteria-food-production>
17. <http://allaboutalgae.com/what-are-algae>

Food Microbiology Practical

Objectives; This course will enable students to:

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

Module No	Objectives	Contents	Evaluation
1	<p>The module will enable the student to:</p> <ol style="list-style-type: none"> 1. To have a knowledge of the commonly used staining techniques. 2. To make the student familiar with the various culture media 	<p>Study of laboratory equipments - Principle, working and use of Microscope, Autoclave, Incubator, Refrigerator, colony counter.</p> <ol style="list-style-type: none"> 1. Study of motility: Hanging drop preparation. 2. Staining techniques: Simple staining Gram staining Spore staining Capsule staining 3. Preparation of culture media composition and uses. 	<p>Performing Practical 15 marks</p>
2	<p>The module will enable the student to:</p> <ol style="list-style-type: none"> 1. To enable students to isolate microorganisms from different sources. 2. To make a preliminary identification of some microorganisms 	<p>Isolation and observation of fungi</p> <ol style="list-style-type: none"> 1. Isolation of bacteria: Using serial dilution streak plate and pour plate techniques: <ul style="list-style-type: none"> ● From air ● From soil 2. Bacteriological Analysis of Water. 3. Bacteriological analysis of milk. 4. Test for surface sanitation. 5. Permanent slides of pathogenic microorganisms 	<p>Performing practical 10 marks</p>

References

1. Frazier, W. C. and Westhoff, D. 5th Edition (2013) Food Microbiology .Tata McGraw-Hill
2. Edward Farnworth , Handbook of fermented and functional foods. 2nd edition (2008)
3. Jay, Modern food microbiology, 7th Edition (2005). Van Nostr and Reinhold Company, New York
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PROGRAMME: B.Sc. in Home Science/ BCA

Department of Food Science and Nutrition

Semester -IV

Course Title: Food Preservation (Th & Pr)

(Offered to students specializing in Food Science and Nutrition)

Course Description:

Principles of food preservation. Preservation by heat (pasteurisation, sterilization) – principles, methods. Chilling processes and equipment: cooling, Preservation by freezing – principle, Changes during freezing and frozen storage. Evaporation. Concentration by freezing. Membrane processes. .Drying – principle, methods, equipment. Specific methods of drying. Changes during the drying process. Rehydration and stability of dehydrated products. Biological methods of preservation. Preservation by additives. Preservation using microwaves. High frequency energy. Introduction of new technology of food preservation.

Objectives -

1. Apply principles of food preservation.
2. Prepare preserved products using different preservation methods.
3. Understand the basic principles of food preservation.
4. Learn the various preservation techniques and their applications.

Learning Outcomes: The student shall be able to:

- Describe the principles of food preservation
- Suggest the application of the preservation process depending on the type of food.
- Determine the thermal processing conditions (time / temperature) for each type of food
- Propose a device that matches a particular conservation process
- Choose the appropriate application of certain conservation processes with regard to the preservation of quality and the satisfactory durability of food products
- Optimize process parameters for selected conservation processes taking into account the physico-chemical properties of food products

Code No.	Subject	Total credits	Th	Pr	Int	Ext	Total
FSN404	Food Preservation	4	3	1	50	50	100

Food Preservation Theory

Module No.	Objective	Content	Evaluation
1	This enables the students to: Understand the need and scope for food preservation Understand the basic principles underlying food preservation	<ol style="list-style-type: none"> 1. Introduction to Food Preservation Importance and objectives of food preservation and traditional methods of food preservation. 2. Basic principles of Food Preservation 3. Causes of food spoilage-growth and activity of microorganisms and insects. 4. Action of enzymes and chemical reactions. 	<p>25 marks</p> <p>Worksheet/ assignment/ test</p>
2	This enables the students to: Understand the various methods of food preservation involving temperatures	<p>Methods of Food Preservation involving temperatures-</p> <ol style="list-style-type: none"> a. Asepsis and removal of micro-Organisms b Use of high temperature c. Factors affecting heat resistance, TDT and Pasteurization. Canning and its use in food industry d Use of low temperature- Freezing, Frozen storage, blanching, Changes during storage and thawing e. Drying or dehydration- factors affecting dehydration, Pre-treatments and post treatments, different techniques of dehydration. 	<p>25 marks</p> <p>Worksheet/ assignment/ test</p> <p>Use of low, high and dehydration will be taught using online teaching using various online aids</p>
3	This enables the students to: Understand other methods and use of preservatives or combination of methods for preserving different kinds of foods	<p>Other Methods of Food Preservation-</p> <ol style="list-style-type: none"> a Use of preservatives Class I and Class II preservatives and developed preservatives. b Irradiation and its applications in various foods, advantages and disadvantages. Other methods- microwave heating, hurdle technology, wax emulsion c. Introduction to packaging materials for preservation of products. Objectives of packaging material. Selection of appropriate packing material. d. Novel packaging techniques 	<p>25 marks</p> <p>Worksheet/ assignment/ test</p>

Food Preservation Practical

Module No	Objectives	Content	Evaluation
4	<p>This module will enable students to:</p> <ol style="list-style-type: none"> 1. Understand and observe the role and mode of action of sugar as a preservative. 2. Understand and observe the role and mode of action of other preservatives and other techniques of preservation. 3. Get hands-on experience in preparation of various preserved products. 	<p>Introduction to Food Preservation – aseptic handling in lab.</p> <p>Preparation of products using sugar as the main preservative: Preparation of products using other preservatives:</p> <p>Pickles Tomato Products Other Sauces Masalas and dry chutneys Freezing of fruits and vegetables Dehydrated foods Visit to canning, cold storage plants and various industries</p>	<p>25 Marks Continuous Evaluation</p> <p>Report on visit to food processing industry</p>

EVALUATION:

Evaluation	Details	Marks
Internal	25 [Th] exam 25 [Pr] = Project, quiz and assignments	25 + 25 = 50Marks
External	Final exam	50 marks
	Total marks	100 Marks

REFERENCES:

1. Frazier W. & Westhoff. D. (2013): Food Microbiology, Tata McGraw- Hill Publisher, New York.
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**SEVA MANDAL EDUCATION SOCIETY'S
DR. BHANUBEN MAHENDRA NANAVATI COLLEGE OF HOME SCIENCE
(AUTONOMOUS)**

NAAC Re-accredited 'A+' Grade with CGPA 3.69 / 4 (3rd Cycle)

UGC Status: College with Potential for Excellence

BEST COLLEGE AWARD 2016-17: Adjudged by S.N.D.T. Women's University

338, R.A. Kidwai Road, Matunga, Mumbai – 400019

PROGRAMME: B.Sc. in Home Science

Department of Food Science and Nutrition

Semester -IV

Food Analysis

(Offered to students specializing in Food Science and Nutrition)

Objectives: This course will enable the students:

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

Code	Subject	Total Credits	Th	Pr	Int	Ext	Total
FSN405	Food Analysis	4	-	4	25	75	100

Module No	Objectives	Content	Assessment
1	<p>This module will enable students to:</p> <ul style="list-style-type: none"> ▪ Understand the significance of food analysis. ▪ Learn about sampling, and the techniques used in sampling. ▪ Have knowledge about various instruments used in food analysis. 	<p>Introduction to food analysis and its importance.</p> <p>Sampling-Definition of sampling, Sampling methods/ techniques. Sampling Techniques in food analysis</p> <p>General classification of sampling methods. Advantages and disadvantages of Sampling</p> <p>Best sampling technique for particular foods</p> <p>General instrumental methods - Working principles and uses of various laboratory instruments used in food analysis-Colorimeter, Spectrophotometer, centrifuge, Kjeldahl's apparatus for protein estimation, Soxhlet apparatus for fat estimation, different balances, Muffle furnace, water bath, glass distillery unit.</p>	<p>25 Marks</p> <p>Quiz Journal Assignments on working principles of various instruments</p> <p>Performing practical Viva</p>

Module No	Objectives	Content	Assessment
2	<p>This module will enable students to:</p> <ol style="list-style-type: none"> 1. Know analytical methods used in estimation of proximate principles. 2. Determine the chemical constants of fats and oils and understand the significance. 3. Know the food standards laid down by FSSAI. 	<p>Quantitative Analysis of proximate principles: Estimation of moisture by AOAC method. Estimation of crude fat/oil by solvent extraction method. (Demonstration only) Estimation of total ash by A.O.A.C. method of ashing. Estimation of protein by Macro kjeldahl method. (Demonstration only)</p> <p>Chemical constants of fats and oils. Determination of Acid value. Determination of Saponification value. Determination of Iodine value.</p>	<p>25 Marks Quiz Journal Assignments</p> <p>Performing practical Viva</p>
3	<p>This module will enable students to:</p> <p>Learn analytical methods used in estimation of various food components.</p>	<p>Estimation of Food Components Estimation of total and free sugar from honey by Benedict's/ Lane and Eynon's quantitative reagent method. Determination of Ascorbic acid (Vit.C) from food sources by 2, 6, dichlorophenol indophenol method. Estimation of sodium chloride (NaCl) salt from butter by Mohr's titrimetric method. Estimation of calcium by titrimetric method (Clerk & Collips). Estimation of phosphorus by Fiske and Subbarao's or Vanadate-Molybdate colorimetric method. Estimation of Iron by dipyrldyl reagent method. Estimation of Acidity in milk by titrimetric method.</p>	<p>25 Marks Quiz Journal Assignments</p> <p>Performing practical Viva</p>
4	<p>This module will enable students to:</p> <p>Gain knowledge about food adulterants and know methods of detection.</p>	<p>Qualitative analysis of common food adulterants. Fats & oils Spices and condiments Milk and milk products Cereals and pulses Honey and jaggery Tea and coffee Sweets and confectionary</p>	<p>25 Marks Quiz Journal Assignments</p> <p>Performing practical Viva</p>

Evaluation	Details	Marks
Internal	Continuous evaluation- for each practical	50Marks
External	Final exam	50 marks
	Total marks	100 Marks

References

1. Harold Egan, Ronald S. Kirk, Ronald Sawyer, David Pearson (1981)“Pearson’s Chemical Analysis of Foods. 8th Edition, Churchill Livingstone.
2. C. Gopalan, B V Rama Sastri; S C Balasubramanian “ Nutritive Value of Indian Foods.” 6th Edition, 1996, Reprinted 2011. National Institute of Nutrition, Hyderabad.
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4. N. Raghuramulu, K. Madhavan, S. Kalyanasundaram (2003) “A Manual of Laboratory Techniques”, 2nd Edition, National Institute of Nutrition.
5. A.Y. Sathe, (1999) “A first course in Food Analysis” 1st Edition New Age International (P) Limited.
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PROGRAMME: B.Sc. in Home Science/ BCA

Department of Food Science and Nutrition

Semester IV

Medical Nutrition Therapy - I

(Offered to students specializing in Nutrition and Dietetics)

Course Description: This course is designed to make the students understand the need and importance of a diet department as well as a dietician in the field of medicine and in hospitals. The course involves dietary management of fever, nutritional anemia, overweight, obesity, underweight, gastro intestinal and liver disorders. It will help the students to relate their theoretical knowledge in a practical set up and will also enable them to choose and plan right therapeutic diet for management of the above mentioned disorder. It will help the students to select particular foods for a given medical condition and thereby help them to develop the skills for planning and preparing various kinds of therapeutic diets.

Course objectives:

The course enables the students to:

1. Explain the role of diet in health and disease.
2. List the causes of obesity, underweight, anemia and diseases related to the gastrointestinal tract and liver.
3. Relate the physiological changes associated with specific diseases.
4. Modify the normal diets for diseased conditions.
5. Recommend and provide appropriate nutrition care for prevention of various diseases.

Learning outcome: After doing this course, the students will be able to tell the duties of a dietician, identify a given disorder, list the causes of various disorders of the GIT and the liver, obesity, underweight and anemia. They will be able to choose the foods allowed and restricted in a given condition and modify the normal diet accordingly. They will recommend dietary guidelines for the same.

Code	Subject	Total credits	Th	Pr	Int	Ext	Total
ND404	Medical Nutrition Therapy – I	4	2	2	50	50	100

Medical Nutrition Therapy – I Theory

Module	Objective	Content	Evaluation
1. Basic concepts of Medical Nutrition Therapy	<p>This module will enable students to:</p> <ul style="list-style-type: none"> • understand the role of a dietitian • List the principles of therapeutic meal planning • Modify the normal diet with respect to nutrients and consistency • Plan diets & recommend dietary guidelines for fever, infections, anaemia, obesity & underweight 	<ul style="list-style-type: none"> • Role of a dietitian • Principle of planning therapeutic diets and hospital diets • Modification of normal diets with special emphasis on macronutrients and micronutrients for fever- Typhoid, infections- TB, HIV, obesity, underweight, anaemia <p>Role of Functional Foods</p>	25 Marks Quiz (Module1+2)

Module	Objective	Content	Evaluation
2 Medical Nutrition Therapy in gastro-intestinal & liver disorders	<p>This module will enable students to:</p> <ol style="list-style-type: none"> 1. Relate the importance of modified diets in specific diseased conditions of the gastro intestinal tract and the liver 2. Plan diets & recommend dietary guidelines for various G.I.T and liver disorders keeping in mind physiological and metabolic alterations 	<p>Physiology of GIT, digestion of food and absorption of nutrients in human body</p> <p>Explain the terms Esophagitis, dysphagia, flatulence, diverticulosis</p> <p>Etiology, Symptoms and MNT for-</p> <ul style="list-style-type: none"> Diarrhea Lactose intolerance Constipation Irritable bowel syndrome (IBS) Ulcerative colitis Celiac disease Gastritis Peptic ulcer Dumping syndrome <p>Physiological role of liver Diseases of liver</p> <ol style="list-style-type: none"> (i) Hepatitis (ii) Cirrhosis & its complications <p>Explain the terms: Cholelithiasis, Cholecystitis, Pancreatitis</p>	<p>5 Marks</p> <p>Assignment on normal values of the blood parameters to be assessed in liver disorders</p> <p>10 Marks Assignment on pre & probiotics</p>

Evaluation	Details	Marks
Internal	Internal- unit test and projects	50Marks
External	Final exam	50 marks
	Total marks	100 Marks

Reference:

- Winterfeldt, Esther A. ; Bogle, Margaret L. . Dietetics : practice and future trends 5th ed. . – Burlington, (2018)
- Kane, Kelly & Prelack, Kathy: Advanced medical nutrition therapy. Burlington. Jones and Bartlett Learning, (2019). 978-1-284-04263-4 (615.854KAN/PRE)
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- Anita F.P. (2002): Clinical Dietetics and Nutrition, 4th Edition, Oxford University Press, Bombay.
- Joshi S. A. (2002): Nutrition and Dietetics, 2nd Edition, Tata McGraw-Hill
- Garrow J.S. & W.P.T. James (2000): Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone Inc.

Medical Nutrition Therapy- I Practical

Objectives-The course enables the students to:

1. Apply principles of diet therapy in preparing foods for specific diseases conditions.
2. Develop skills in planning and preparation of foods, for specific disease conditions keeping in mind cost, seasonal availability and psychosocial factors.

Module	Objectives	Content	Assessment
1	<p>This module will enable students to:</p> <ol style="list-style-type: none"> 1. To know the market trends in nutritional supplements 2. To apply the principles of diet therapy in modifying normal diet 3. Develop ability to plan diets for weight management, fever, anemia 	<p>Basic of Therapeutic modifications</p> <ol style="list-style-type: none"> 1. Nutritional supplements 2. Modification of normal diet for consistency, texture 3. Modification of normal diet for <ol style="list-style-type: none"> (i) weight management (ii) fever (iii) anaemia 	<p>25 Marks</p> <p>Market survey on nutritional supplements</p> <p>Therapeutic Diet Planning</p>
2	<p>This module will enable students to:</p> <ol style="list-style-type: none"> 1. Develop skills in planning and preparation of foods for specific G.I disease condition 	<p>Therapeutic modifications in GI tract disorders and liver disorders</p> <ol style="list-style-type: none"> 1. Constipation 2. Diarrhoea 3. Peptic ulcer 4. Hepatitis 5. Cirrhosis 	<p>25 Marks</p> <p>Therapeutic Diet Planning Viva</p>

Evaluation	Details	Marks
Internal	Internal- continuous evaluation of Menu plans and cooking	50 Marks
External	Final exam	50 marks
	Total marks	100 Marks

References:

1. Krause M.M, Mahan L. K. & Escott S.S. (2015), Krause's Food, Nutrition and Diet therapy, 14th Edition, W. B. Saunders Company, Philadelphia.
2. Williams S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror / Mosby College Publishing, St. Louis.
3. Cataldo D.W. (2003): Nutrition and Diet Therapy - Principles & Practice, West Publishing Company, San Francisco.
4. Garrow J.S. & W.P.T. James (2000): Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone Inc.
5. Anita F.P. (1989): Clinical Dietetics and Nutrition, Oxford University Press, Bombay.
6. Sri Laxmi B. (2003): Dietetics, 5th edition, New Age International Pvt. Ltd., Mumbai.
7. Robinson C. H., Lawler M. R., Cheneweth W.L. and Garwick A. E. (1986): Normal and Therapeutic Nutrition, MacMillan Publication Co.
8. Davis J and Sherer K, (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.
9. Escott-Stump, S. (1998). Nutrition and Diagnostic Related Care, 4th Edition, Williams and Wilkins.
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PROGRAMME: B.Sc. in Home Science

Department of Food Science and Nutrition

Introduction to Hospital Administration and Food Service

(offered to students specializing in Nutrition and Dietetics)

Objectives -The course shall enable students to:

1. Understand the basic concepts related to Hospital Management
2. Understand the working in a Hospital
3. Learn how the Kitchen & Dietary Services in the hospital are organized
4. Obtain information on different quality Audits that are carried out in a hospital setting
5. Develop skills in quantity Food production and Service

Learning outcome-

Students will:

- Know the different health systems in India and learn about the National health policy and its implementation.
- Learn about different medical audits that are carried out in hospital settings and requirements for the same.
- Acquire practical knowledge of how food service is carried out in hospital settings
- Learn basic skills of quantity food preparation.

Code	Course	TC	Th C	Pr C	Int M	Ext M	Total
ND405	Introduction to Hospital Administration and Food Service	4	2	2	50	50	100

Module No.	Objective	Content	Evaluation
1.	The learner shall be able to- Understand the health system in India and the national health policy and its implementation	Basic Concepts- <ul style="list-style-type: none"> ● Health scenario of India-- past, present and future ● Healthcare delivery system in India at Primary, Secondary and Tertiary Care. ● Indigenous system of medicine in India ● National Health Policy 	Individual assignments, presentations and online & written exam. (25 marks)
2	The learner shall be able to- Understand the basic concepts of health care and learn about different medical audits that are carried out to maintain quality in hospital service.	2. Working in a hospital <ul style="list-style-type: none"> ● Concept of Health Care Industry & its ever-changing character. ● Understanding functioning of Corporate multi-specialty hospital ● Managerial activities for effective hospital functioning. ● Different Health Insurance Policies – Analysis and Management in brief. (tabular format) 3. Maintaining quality in hospital service. Introduction to Quality Management Programme, <ul style="list-style-type: none"> ● ISO clauses, Medical Audits, NABL, NABH, JCI, BIS (in brief) 	Individual assignments, presentations and online & written exam. (25 marks)

Practical-

Module No.	Objective	Content	Evaluation
3	<p>The learner shall be able to learn-</p> <ul style="list-style-type: none"> • basic concepts related to kitchen and dietary services right from receiving raw ingredients to food service to patients. • they will also learn the different kitchen layouts and how they would affect food service • learn the role of different personnel involved in diet planning, preparation and delivery of food in a hospital 	<p>Kitchen & Dietary Services-</p> <p>1) Organization, Recruitment and understanding the role of kitchen personnel</p> <p>2) Overview of kitchen lay out and its adjacent areas – -drawing and observation of layouts in a hospital and in a cafeteria</p> <p>3) Work Flow in the kitchen and Understanding Food service in the Hospital and the Role of the Dietitian.</p> <p>*Actual visit to a hospital kitchen and dietetics department- report to be prepared.</p> <p>5) Delivery process of food to the patient according to diet chart – preparing charts on basis of case study of a hospital</p> <p>6) Hospital food store- Forming a sample indent for a case study.</p> <p>6) Safety measures followed Preparing a checklist for the safety measures necessary.</p>	<p>Individual assignments, presentations (25 marks)</p>

Module No.	Objectives	Content	Evaluation
4.	<p>The learner shall be able to:</p> <ul style="list-style-type: none"> • Develop skills in quantity food production 	<p>Quantity food production (15 serves)</p> <ul style="list-style-type: none"> - Salads for Weight reduction - Therapeutic Snacks - Mini meals for a Hospital cafeteria - Desserts • Beverages 	<p>25 Marks</p> <p>Planning and cooking in quantity.</p> <ul style="list-style-type: none"> • organisation of a hospital cafeteria as an innovative activity

Evaluation	Details	Marks
Internal	25 [Th] exam 25 [Pr] = Project, quiz and assignments	25 + 25 = 50Marks
External	Final exam	50 marks
	Total marks	100 Marks

References-

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- Duties & Responsibilities of Hospital Staff Paperback – 1 January 2018. by Dr. Arun Kumar (Author). Notion Press, ISBN: 9781644295472, 1644295474. Edition: 1, 2018.
- Hospital and Healthcare Accreditation (As Per the Guidelines of Nabh, Nabl, Jci) Paperback – 30 December 2017. Publisher Jaypee Brothers Medical Publishers
- Hospitals - Facilities Planning & Management Hardcover – 1 July 2017, by G. D Kunders McGraw Hill Education; 1st edition (1 July 2017); Language: English; ISBN-10: 0070502692
- Food Production Operations Paperback – 30 April 2014. by Parvinder Bali published by Oxford University Press
- Hospital Economics: A Primer on Resource Allocation to Improve Productivity & Sustainability – (2018) by A. Heri Iswanto Publisher: Productivity Press; 1st edition