

B.VOC PROGRAM (4 Years Honors)

2020-21 onwards (21Jan2021)



B. Vocation

FOOD SCIENCE AND NUTRITION

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TABLE OF CONTENTS

S. No	Particulars	Page No.
1	Resolutions of the BOS	03
2	Details of paper titles & Credits	04-07
	a. Proposed combination subjects:	08
	b. Student eligibility for joining in the course:	08
	c. Faculty eligibility for teaching the course	08
	d. List of Proposed Skill enhancement courses with syllabus, if any	08
	e. Any newly proposed Skill development/Life skill courses with draft syllabus and required resources	08
	f. Required instruments/software/ computers for the course	08-09
	g. List of Suitable levels of positions eligible in the Govt/Pvt organizations	09
	h. List of Govt. organizations / Pvt companies for employment opportunities or internships or projects	10
	i. Any specific instructions to the teacher /paper setters/Exam-Chief Superintendent	10
3	Program objectives, outcomes, co-curricular and assessment methods	11-12
4	Details of course-wise syllabus for Theory and Lab	13-53
5	Model Question Papers for Theory and Lab	54-79
6	Details of Syllabus on Skill Enhancement courses and Model Question Papers for Theory and Lab	13-53
7	Panel of Experts for Question Paper setting/Evaluation	80

Note: BOS is to provide final soft copy in PDF and word formats and four copies of hard copies in bounded form to the office of Dean Academic affairs.

1. Resolutions of the Board of Studies

Meeting held on: 21-1-21.....Time:10:30 AM
At: Convention center, Adikavi Nannaya University
RAJAMAHENDRAVARAM

Agenda:

Members present:

1.

Resolutions:

2. DETAILS OF PAPER TITLES & CREDITS

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
Course structure and syllabi: w.e from 2020-2021 Admitted Batch

I Year Semester – I

S. No	Name of the Course	Course Type (T/L/P)	Hours/week (Sciences 4+2)	Credits (Science 4+1)	Each course Evaluation		
					Conti-Assess	Univ-exam	Total
1	Chemistry (Inorganic and Physical Chemistry) *	T	4	4	25	75	100
2	Chemistry (Practical-I Analysis of SALT MIXTURE) *	L	2	1	0	50	50
3	Food Production Trends and Basic nutrition	T	4	4	25	75	100
4	Food Production Trends and Basic Nutrition Practical	L	2	1	0	50	50
5	Food and Nutrition	T	4	4	25	75	100
6	Food and Nutrition Practical	L	2	1	0	50	50
7	Principles of Food Preservation (No Practical)	T	4	4	25	75	100
8	On Job Training - 1	L	2	1	0	50	50
	Total		24	20			

Note; Course type code: T: Theory, L: Lab, P: Problem solving

* **Common With B.Sc**

ADIKAVI NANNAYA UNIVERSITY
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I Year Semester – II

S. No	Name of the Course	Course Type (T/L/P)	Hours/week (Sciences 4+2)	Credits (Science 4+1)	Each course Evaluation		
					Conti-Assess	Univ-exam	Total
1	Chemistry (Organic and General Chemistry) *	T	4	4	25	75	100
2	Chemistry (Practical-II Volumetric Analysis) *	L	2	1	0	50	50
3	Product Development and Formulation	T	4	4	25	75	100
4	Product Development and Formulation Practical	L	2	1	0	50	50
5	Fundamentals of Clinical Nutrition	T	4	4	25	75	100
6	Fundamentals of Clinical Nutrition Practical	L	2	1	0	50	50
7	Basic Dietetics (No Practical)	T	4	4	25	75	100
8	On Job Training - 2	L	2	1	0	50	50
	Total		24	20			

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ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
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II Year Semester – III

S. No	Name of the Course	Course Type (T/L/P)	Hours/week (Sciences 4+2)	Credits (Science 4+1)	Each course Evaluation		
					Conti-Assess	Univ-exam	Total
1	Chemistry (Organic Chemistry and Spectroscopy) *	T	4	4	25	75	100
2	Chemistry (Practical – III Organic preparation and IR Spectral Analysis) *	L	2	1	0	50	50
3	Food Science	T	4	4	25	75	100
4	Food Science Practical	L	2	1	0	50	50
5	Food Safety and Microbial Standards	T	4	4	25	75	100
6	Food Safety and Microbial Standards Practical	L	2	1	0	50	50
7	Extrusion Technology (No Practical)	T	4	4	25	75	100
8	On Job Training - 3	L	2	1	0	50	50
	Total		24	20			

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ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
Course structure and syllabi: w.e from 2020-2021 Admitted Batch
II Year Semester – IV

S. No	Name of the Course	Course Type (T/L/P)	Hours/week (Sciences 4+2)	Credits (Science 4+1)	Each course Evaluation		
					Conti-Assess	Univ-exam	Total
1	Chemistry (Inorganic, Organic and Physical Chemistry) *	T	4	4	25	75	100
2	Chemistry (Practical – IV Organic Qualitative analysis) *	L	2	1	0	50	50
3	Chemistry (Inorganic and Physical Chemistry) *	T	4	4	25	75	100
4	Chemistry (Practical-V Course Conductometric and Potentiometric Titrimetry)*	L	2	1	0	50	50
5	Vitamins in Nutrition	T	4	4	25	75	100
6	Vitamins in Nutrition	L	2	1	0	50	50
7	Techniques in Food Analysis	T	4	4	25	75	100
8	Techniques in Food Analysis Practical	L	2	1	0	50	50
9	Food Additives	T	4	4	25	75	100
10	Food Additives Practical	L	2	1	0	50	50
11	Basic Research Methodology in Nutrition (No Practical)	T	4	4	25	75	100
12	On Job Training – 4	L	2	1	0	50	50
	Total		24	20			

* Common With B.Sc

a. Proposed combination subjects

Chemistry/Microbiology/Biotechnology – Any subject can be chosen as M1

b. Student eligibility for teaching the course

Intermediate passed with combination of Bi.P.C, M.P.C or any other 2 year Intermediate equivalent courses

c. Faculty eligibility for teaching the course

Food Science and Nutrition – M Tech (Food Technology) or M Sc (Food Science and Nutrition) or Ph.D. M.Sc or M Tech - NET and SET Qualified

Biotechnology - M Tech (Biotechnology) or M Sc (Biotechnology) or Ph.D. M.Sc or M Tech - NET and SET Qualified

Biochemistry -Microbiology- M Sc or Ph.D. M.Sc - NET and SET Qualified

d. List Proposed Skill enhancement courses with syllabus, if any

All Core papers are skill enhancement courses

e. Any newly proposed Skill development / Life skill courses with drafts syllabus and required resources

No

f. Required instruments / software / computers for the course (Lab/ Practical course – wise required i.e ., for a batch of 15 students)

Sem No	Lab/Practical Name	Name of Instruments /software/computers required with specifications	Brand Name	Qty Required
1	Food and Microbiology practical's	Fermenter *	Lambda Laboratory instruments	01
2		Autoclave	mushroom lab equipment Autoclave Vertical Double Wall	01
		Incubator*	Laboratory Bacteriological incubator model LI/45	01
		Hot Air oven	Bsco Hot air Oven 14X14X14	01
		Kjeldahl digester + Distillator	KjelteckKjeldahl Automatic Nitrogen Distillation System Model: DISTYL EM S (PELICAN KELPLUS) +KEL PLUS Micro Six Sample	01 + 01

	(Protein estimation)	System(100ML capacity) Model KES 06R(Block Digester)	
	Water bath	Genist international verticle water bath	01
	pH Meter	Cyberscan 1100	
	Soxhlet apparatus	Sigma Aldrich	01
	Colourimeter	Colour flex ^R	01
	Spectrophotometer	Labline stock centre, Kalbadevi, Mumbai, Maharashtra	01
	Cabinet dryer	Shini Plastic Technologies India Private Limited Chakan, Pune, Maharashtra	01
	Laboratory scale spray dryer	Jay Instruments & Systems Private Limited Navi Mumbai, Thane, Maharashtra	01
	Lab scale rotary vacuum evaporator	Buchi® Rotavapor® R-215 evaporator with water jacket	01

g. List of suitable levels of positions eligible in the Govt/Pvt organization

S.No	Position	Company/Govt organization	Remarks	Additonal skills required, if any
1	Food Safety Officer	Dept of Health and family Welfare	Nil	Nil
2	Food Safety Inspector	Dept of Health and family Welfare	Nil	Nil
3	Quality Analysts	Private Sectors	Nil	Nil
4	Food Technologists	Private Sectors	Nil	Nil

h. List of Govt. organizations/ Pvt companies for employment opportunities or internships or projects

S.No	Position	Company/Govt organization	Remarks	Additional skills required, if any
1	Food Safety Officer	Dept of Health and family Welfare	Nil	Nil
2	Food Safety Inspector	Dept of Health and family Welfare	Nil	Nil
3	Quality Analysts	Private Sectors	Nil	Nil
4	Food Technologists	Private Sectors	Nil	Nil

I. Any specific instructions to the teacher/ paper setters/ papers setters/Exam -Chief Superintendent

Nil

3. Program objectives, outcomes, co-curricular and assessment methods

B. VOCATION	FOOD SCIENCE AND NUTRITION
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1. Aim and objectives of UG program in Subject:

- Promote, facilitate and influence the best possible standards Food Science and Nutrition worldwide
- Provide the technical and general knowledge necessary for establishing food business.
- Be the organization of choice for evidence-based advice and guidance for Nutrition based research organizations
- Be the membership body of choice for Food Industries, and to provide Food Science and Nutrition related information for all types of food related research organizations.

2. Learning outcomes of Subject

- Student should able to understand the basic food science and nutrition concepts behind different processed, semi processed and unprocessed foods
- Student should able to formulate new foods in FMCGs, to perform qualitative and quantitative tests, which will satisfy the needs of the food industry
- Student should able to acquire knowledge required to become an food entrepreneur. Student should able to acquire skills to work in export-oriented Food Industries.

3. Recommended Skill enhancement courses:

Core subjects are all Skill enhancement courses

4. Recommended Co-curricular activities:

A. Measurable:

1. Assignments on Food Science and Nutrition
2. Student seminar on Nutrition Topics
3. Quiz Programmes on Food Science and Nutrition
4. Individual Field Studies/ projects
5. Group discussion
6. Group/Team Projects

B. General:

1. Collection of news reports and maintaining a record of paper-cuttings relating to topics covered in syllabus
2. Group Discussions on new trends Aquaculture related industries
3. Watching TV discussions and preparing summary points record of paper – cuttings relating to topics covered in syllabus
4. Any similar activities with imaginative thinking.

5. Recommended Continuous Assessment methods:

4. Details of course – wise Syllabus (Five units with each unit having 12 hours of class work)

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – I
PAPER – I FOOD PRODUCTION TRENDS AND BASIC NUTRITION

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce the student about the current trends in food production and processing	By the end of the course, student will be known about organizations supporting food processing and will be able to programme food guides for different age groups
To impart knowledge on basic nutrition and diet concepts	Student will be able to differentiate types of Carbohydrates, proteins, Vitamins and Minerals present in different food matrices
To impart knowledge on concepts of Proteins, Carbohydrates & Vitamins	Student will be able to prepare basic nutrition guide for different age groups

UNIT-I

Introduction - Food Science and Technology. Definition - Food science, Food technology and their sub discipline, difference between Food Science and Technology. Status of food processing industry in India and abroad Reasons for slow growth of Indian food industry- scope for expansion of market - Dairy, Bakery, Confectionary, Beverages and Snack foods etc. Potential and prospects of Indian food Industry.

UNIT-II

Popularity of Indian foods- National and International Projects/Institute and their food products, Magnitude and Interdependent activities and processing agencies. Ministry of Food Processing - Objectives and its function to develop the food processing industry. APEDA - Agricultural Processed Food Products Export Development Authority, Food characteristics - Food nutrients-Proteins, Fats, Carbohydrates, Vitamins and Minerals- Functions – Sources, Classification of foods based on pH - Low acid food, medium acid food, highly acid food and acid food - Definition and Examples.

UNIT-III

Introduction to nutrition - Food as source of nutrients, functions of food, definition of nutrition, nutrients & energy, adequate, optimum & good nutrition, malnutrition. Nutrition - Fitness, Athletics & Sports. Food guide - Basic five food groups, How to use food guide (according to R.D.A.), Interrelationship between nutrition & health : - Visible symptoms of good health

UNIT-IV

Use of food in body - Digestion, Absorption, transport & utilization. Role of fibres in human nutrition. Carbohydrates : Functions, classification, food sources, storage in body. Fats & oils : composition, saturated and unsaturated fatty acids, classification, food sources, function of fats. Proteins - composition, sources, essential & non-essential amino acids, functions, Protein deficiency. Processed supplementary foods. Food sanitation in hygiene

UNIT-V

Water - as a nutrient, function, sources, requirement, water balance & effect of deficiency. Minerals - macro & micronutrients. - functions, sources. Bioavailability and deficiency of Calcium, Iron, Iodine, Sodium & Potassium (in very brief) Vitamins (water & fat soluble) - definition, classification & functions. Effect of cooking & heat processing on the nutritive value of foods.

Textbook

N.N. Potter, Food Science, III edition, AVI Publishing Co. Inc., West Port, USA, 1978.

Books for Reference

1. N.N. Potter, Food Science, III edition, AVI Publishing Co. Inc., West Port, USA, 1978.
2. K. Vijaya Raghavan, Agricultural Administration in India.
3. Chidida Singh, Modern Techniques of Raising Field Crops, Oxford & IBH Publishing Co, New Delhi.
4. Graft and Saguy, Food Product Development, CBS Publishers, New Delhi.
5. M. Swaminathan, Food and Nutrition, Vol I &II, The Bangalore Printing & Publishing Co. Ltd, Bangalore.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – I
PAPER – I FOOD PRODUCTION TRENDS AND BASIC NUTRITION PRACTICAL

Credits 1

Teaching Hours 2

List of Experiments

1. Use and care of kitchen equipments.
2. Controlling techniques - Weights and measures standard, household measures for raw and cooked food.
3. Food preparation and classifying recipes as good, moderate or poor, sources of specific nutrients, Amount of ingredients to be in standard recipe - a) portion size - b) Beverages - tea, coffee, cocoa, fruit juice, milk, milk shakes. c) Cereals and flour mixtures - basic preparation & their nutritive value - boiled rice and rice pulao, chapati, puri, paratha, sandwiches, pastas, pancakes, cookies & cakes.
4. Vegetables & fruits - Simple salads, Dry vegetables, Curries, fruits preparation using fresh and dried stewed fruit, fruit salad
5. Mix and milk products Porridges, Curds, Paneer and their commonly made preparations, Milk based simple desserts and puddings, custard, kheer, ice cream

List of Major Equipments/Apparatus

Kitchen Equipment like Knives

Measuring Jars

Measuring Spoons

Utensils & Paneer Press

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – I
PAPER II FOOD AND NUTRITION

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce about the Nutrition concepts	By the end of the course, student will be known about nutritional profiles of foods
To impart knowledge on diet formulation	Student will be able to identify different nutrients in foods
To impart knowledge on processing of nutritional foods	Student will be able to identify nutritional foods and can formulate nutrient rich foods

UNIT I

INTRODUCTION TO FOOD AND NUTRITION

Basic terms used in study of food and nutrition, BMI and Nutritional Status, Understanding relationship between food, nutrition and health.

UNIT II

BALANCED DIET

Functions of food-physiological, psychological and social, Concept of Balanced Diet, Food Groups, Food Pyramid.

UNIT III

NUTRIENTS

Classification, digestion, functions, dietary sources, RDA, clinical manifestations of deficiency and excess and factors affecting absorption of the following in brief: Energy, Carbohydrates, lipids and proteins, Fat soluble vitamins-A, D, E and K, Water soluble vitamins – thiamin, riboflavin, niacin, pyridoxine, folate, vitamin B12 and vitamin C, Minerals – calcium, iron, iodine, fluorine, copper and zinc

UNIT IV

CONCEPTS OF MEAL PLANNING Factors affecting meal planning, understanding specific considerations for planning meal for different groups of people.

UNIT V

METHODS OF COOKING Dry, moist, frying and microwave cooking, Advantages, disadvantages and the effect of various methods of cooking on foods.

NUTRITIONAL LABELING

Importance, global trends, codex guidelines, nutritional labelling in India, FSSAI guidelines.

Text Book

Lehninger, A.L., Nelson, D.A and Cox, M.M. 2005. Principles of Biochemistry. CBS Publishers and Distributors, Delhi.

Books for Reference

Buchanan, B.B., Gruissem, W. and Jones, R.L. 2002. Biochemistry and Molecular Biology of Plants. John Wiley and Sons, UK.

Conn, E.E., Stumpf, P.K., Bruening, G. and Doi, R.H. 1995. Outlines of Biochemistry. John Wiley and Sons Inc., Singapore.

Jayaraman, J. 1980. Laboratory Manual in Biochemistry. Wiley Eastern Publishers, New Delhi.

Lehninger, A.L., Nelson, D.A and Cox, M.M. 2005. Principles of Biochemistry. CBS Publishers and Distributors, Delhi.

Plummer, D.T. 1979. An introduction to Practical Biochemistry. Tata McGraw-Hill Publishing Co., New Delhi.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – I
PAPER II FOOD AND NUTRITION PRACTICAL

Credits 1

Teaching Hours 2

List of Experiments

1. Identification of food sources for various nutrients using food composition tables.
2. Record diet of self using 24 hour dietary recall and its nutritional analysis.
3. Introduction to meal planning, concept of food exchange system.
4. Planning of meals for adults of different activity levels for various income groups.
5. Planning of nutritious snacks for different age and income groups.
6. Preparation of nutritious snacks using various methods of cooking.
7. Nutritional labelling of food products.
8. Estimation of BMI and other nutritional status parameters.

List of Equipment/Apparatus

No equipments are required as the subject covers most of the survey concept.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – I
PAPER III PRINCIPLES OF FOOD PRESERVATION

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce about the Preservation concepts	By the end of the course, student will be known about different preservation methods
To impart knowledge on different preservative methods	Student will be able to identify different chemical changes during preservation of foods
To impart knowledge on processing of foods	Student will be able to identify processing parameters for foods

UNIT -1 Scope - Principles of Food Science and Technology - Introduction - Definitions of Food, Food Science and Technology - introduction to other relevant terms pertaining to Food Technology. Food Classification. Food Spoilage-types- factors affecting spoilage - Definition of Food Spoilage - Major types of food spoilage including micro biological - Bio-chemical, physical and enzymatic spoilage (Bio-chemical spoilage). Factors affecting food spoilage - Extrinsic: Temperature- RHO₂, CO₂; Intrinsic - pH – Moisture content- aw, Chemical nature - oxidation reduction potential - physical structure - available nutrients -presence of anti microbial agents. General Principles of Food Preservation - Physical Methods - Chemical Methods -Fermentation - Other Methods.

UNIT -2 Different processing methods of food - Objectives of Cooking - Cooking methods – Moist heat - dry heat and combination method. Preservation by Thermal Processing - Blanching - Pasteurization-types-equipment -Sterilization. Preservation by canning - different unit operations involved in canning-equipment used in canning- types of canning containers. Use of low temperatures - Types of cold preservation - Chill storage - Procedure of low Temperature storage - types of freezing equipment used. Various changes occurring during freezing and thawing - methods of food freezing – Quick fast freezing and slow freezing-factors affecting storage.

UNIT -3 Drying / Dehydration - Definition of drying - Advantages of dried foods - Sun drying - Mechanical dehydration - Direct heated driers - Indirect heated driers - Cabinet driers -Tunnel drier - Drum Drier - Fluidized Bed Drier - Spray Drier. Factors affecting dehydration of food. Dehydration - methods of dehydration-advantages & disadvantages of dehydration. Changes in constituents of Food materials - Shrinkage, case hardening - Thermo plasticites- Reconstitution properties - Thin layer drying – Deep Bed Drying.

UNIT -4 Flash Evaporator - Freeze Concentration - Ultra Filtration and reverse osmosis. Preservation by radiation - Food irradiation - What is food irradiation - Forms of energy -Ionizing radiation and sources -

Units of radiation - Effects of radiation. Irradiation doses for treating foods - Mechanism underlying Irradiation-Advantages- Disadvantages. Preservation by Chemicals - Introduction - Class I Preservatives - Class II Preservatives -Safe limits of usage. Preservation by mould inhibitors, antibiotics, acidulants - Antioxidants - Antibiotics – Mould inhibitors - Parabens - Epoxides - Benzoic acid - Propionic Acid.

UNIT -5 Preservation by fermentation - Definition - Some industrial fermentation in food industries. Recent methods in preservation: Pulsed electric field processing - principle - equipment - Mechanism - effect on quality - advantages – disadvantages. High pressure processing - principle - equipment - Mechanism - effect on quality - advantages- disadvantages. Processing using ultrasound - Principle - equipment - mechanism - effect on food quality. Dielectric and Ohmic heating - Principle - equipment - mechanism - effect on food quality. Infrared heating - Theory - equipments - effect on food quality.

Textbook

N.N. Potter, Food Science, III edition, AVI Publishing Co. Inc., West Port, USA, 1978.

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3. M. Swaminathan, Food and Nutrition, Vol I &II, The Bangalore Printing & Publishing Co. Ltd, Bangalore.

ADIKAVI NANNAYA UNIVERSITY
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2020-21 Admitted Batch
I Year Semester – I
PAPER – III ON JOB TRAINING-I

Credits 1

Teaching Hours 2

On Job Training provides students adequate experience in planning and managing an enterprise in totality starting from procurement of raw material to processing, production, packaging and storage of products, organizing resources and utilities, sale of products, maintain accounts and analyze profits. Finally, students will present their work along with a report of their performance. The Report should contain following. Developing a Business Plan/ Project Proposal I Identification of the product to be manufactured ii Market Survey iii Analysis of the existing status of the identified product and targeted market and customer iv Innovativeness and Creativity v Preparation of the project proposal with supply chain of inputs, personnel plan, production plan, finance plan, etc. and its preparation Plan for the Production i Organization of resources ii Organizing utility iii Sequential grouping of activities iv Packaging and storage v Product pricing – physical inputs, man-hours, depreciation, etc. vi Time management Production i Regularity in production ii Adhering to production plan iii Product quality assessment iv Maintenance of production records v Team work Sales i Sales strategy ii Sales volumes iii Assessment of sales performance iv Profit generated including C/B ratio, payback period, etc. Documentation and Report Presentation & Evaluation ii Personnel Management ii Preparation of final report & Oral performance.

II SEMESTER

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – II
PAPER I PRODUCT DEVELOPMENT AND FORMULATION

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce about the Product development	By the end of the course, student will be known about different formulations
To impart knowledge on formulation of foods	Student will be able to identify different ingredients used in processed foods
To impart knowledge on formulating innovative foods	Student will be able to formulate new foods

Unit-1

Introduction to the Product development and formulation - Need for Product development. New food product - Definition - General characteristics of New food product - Classes of new Food products - Line extensions - Repositioning of existing products - New form of existing product - Reformulation - New packaging - Innovative products and Creative products and Value added products

Unit-2

Difference between Market and Market places; Customers and Consumers; Marketing Characteristics of the product , Product Life cycle - profit picture. Factors affecting food product development - Corporate factors - Market place factors - technological pressures - Governmental issues and legislations Stages/Phases of new product development - Company objectives - Perceived needs of Market - Ideas - Screening - Feasibility studies - Consumer research - Financial review Development - Production - Consumer trials -Test market

Unit-3

Generation of Food product Ideas - Sources of new product ideas - The market places - types of market places - Within the company - Outside the market place Consumer studies - types of studies, methods of data collection - Surveys and polling - telephone and mail surveys - focused group discussions - Delphic oracle and Market place analysis and external environment as a source of ideas. Organizing for new product development - Concepts of research and development -Creativity

Unit-4

Criteria of screening - general criteria for screening - Constraints - financial and technical constraints Development of Strategy from Marketing's Perspective - Marketing functions, market research, Sales

and marketability of the product. Standardization of product formulation and product design; Adaptable suitable technology role of Engineering in the development process

Unit-5

Process design, Scale - up and In - process specifications, Manufacturing plant and Technical aspects and-production trials. Market testing - methods of testing – Evaluation. Quality assessment of new developed products. Costing/pricing and economic evaluation of the product. Product launch and commercialization of the product

Books for Reference

1. N.N. Potter, Food Science, III edition,. AVI Publishing Co. Inc., West Port, USA,1978.
2. K. Vijaya Raghavan, Agricultural Administration in India.
3. Chidda Singh, Modern Techniques of Raising Field Crops, Oxford & IBH Publishing Co, New Delhi.
4. Graft and Saguay, Food Product Development, CBS Publishers, New Delhi.
5. M. Swaminathan, Food and Nutrition, Vol I &II, The Bangalore Printing & Publishing Co. Ltd,Bangalore.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – II
PAPER I PRODUCT DEVELOPMENT AND FORMULATION PRACTICAL

Credits 1

Teaching Hours 2

List of Experiments

1. Market survey of existing various products - I
2. Market survey of existing various products - II
3. Formulation of new products based corporate decision
4. Formulation of Protein –energy rich products
5. Formulation of low calorie (Fat replacer) products
6. Formulation products with low sodium content
7. Formulation of Glycemic index based products
8. Formulation of Cholesterolemic index based foods
9. Formulation of Phyto-chemical based Products

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – II
PAPER II FUNDAMENTALS OF CLINICAL NUTRITION

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce about the diet concepts	By the end of the course, student will be known about diet formulations
To impart knowledge on nutritional status	Student will be able to identify nutrition of different foods
To impart knowledge on principles of planning diet	Student will be able to plan different foods

Unit-1

Introduction to Clinical Nutrition and Dietetics- Definition and history of dietetics. Dietetics contemporary in medical management. Concepts of a desirable diet for optimum health. Interrelationship between food, nutrition and health. Factors affecting food choices, Regulation of food intake-hunger, satiety, role of neurotransmitters.

Unit-2

Role of dietician in hospital- specific functions, team approach in patient care, psychological consideration, interpersonal relationship with patients. Nutrition and medical ethics. Hospital dietary-scope and importance, types of food service, quality management. Assessment of nutritional status and development of nutrition care plan: in clinical situations for hospitalized and out patients.

Unit-3

Somatic, biological, clinical and dietary assessment, environmental and behavioral data analysis and interpretation. . Medical records-types, uses. Factors to be considered for counseling –Nutritional and health conditions including body care- skin, hair, face, hands, feet etc. Aging, gender related and other problems.

Unit-4

Principles of planning a normal diet: characteristics of a normal diet, meeting nutrient requirements of individuals and family. Use of Dietary guidelines for Indians. A. Objectives of diet therapy- Regular diet and rationale for modifications in energy and other nutrients, texture, fluid, soft diets etc.

Unit-5

Enteral and parenteral feeding-principles, types, methods of administration, monitoring and complications. Dietary principles and management of special conditions a. Surgical conditions, burns and organ transplants b. Protein and energy malnutrition (hospital and domiciliary treatment) c. Nutrient deficiencies – Vitamin A, iodine, iron, osteoporosis.

Text Books

Mano Ranjan Kalia First Edition 2002, Food Analysis and Quality Control. Kalyani Publishers, New Delhi, Hyderabad.

Books for Reference

S.S. Nilson, Food Analysis, Aspen Publishers, Gaithery Berg, Mary Land. AOAC methods For Food Analysis.

Y. Pomeranz and C.E. Meloan, Food Analysis, Theory and practice, A.V.I Publishing Company, INC West Port, Connecticut, U.S.A.,

Jayaraman, J. 1980. Laboratory Manual in Biochemistry. Wiley Eastern Publishers, New Delhi.
Plummer, D.T. 1979. An introduction to Practical Biochemistry. Tata Mc Graw-Hill Publishing Co., New Delhi.

Sadasivam, S. and Manickam, A. 1996. Biochemical methods for Agricultural Sciences. New Age International Publisher, New Delhi.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – II
PAPER II FUNDAMENTALS OF CLINICAL NUTRITION PRACTICAL

Credits 1

Teaching Hours 2

List of Experiments

1. Diet and nutrition surveys:
 - (a) Identification of vulnerable and risk groups.
 - (b) Diet survey for breast-feeding and weaning practices of specific groups.
 - (c) Use of anthropometric measurement in children.
2. Preparation of visual aids.
3. Field visit to
 - (a) Observe the working of nutrition and health oriented programmes (survey based result).
 - (b) Hospitals to observe nutritional deficiencies.

List of Major Equipments

Survey and Observation

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – II
PAPER III BASIC DIETETICS

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce about therapeutic nutrition	By the end of the course, student will be known about diet formulations
To impart knowledge on different diets	Student will be able to identify nutrition of different foods
To impart knowledge on hospital diets	Student will be able to know importance of diet

Unit-1

Role of dietarian : The hospital & community. Basic concepts of diet therapy. Principles of diet therapy & therapeutic nutrition for changing needs. 4. Adaptation of normal diet for changing needs. Routine hospital diets - Regular diet, light diet, full liquid and tube feeding.

Unit-2

Modification of diet - Febrile conditions, infections and surgical conditions. Diets for gastro - intestinal disorders, constipation, diarrhoea, peptic ulcer. Diet for renal diseases - Nephritis, Nephrotic syndrome and renal failure. Diet for obesity and cardiovascular disorders.

Unit-3

Diet for Diabetes mellitus. Diet & nutrition in kidney diseases. Nutrition in cancer. Nutrition in Immune system dysfunction, AIDS & Allergy. Nutrition support in metabolic disorders. Nutrition in burns and surgery.

Unit-4

Nutrition - Addictive behaviour in anorexia, nervosa, bulimia & alcoholism. Nutrient drug interaction. Feeding the patients - Psychology of feeding the patient, assessment of patient needs.

Unit-5

Feeding infants & children - problems in feeding children in hospitals. Nutrition & diet clinics - Patients checkup and dietary counseling, educating the patient and follow up .

Text Books

Srivastava.P.R. and Sanjeev Kumar. Fruit and vegetable preservation - 3rd Edition. International Publishers, Delhi.

Books for Reference

Giridharlal, Siddappa and Tandon. Preservation of fruits and vegetables.ICAR, New Delhi. Sudhir

Gupta (Compiled). Fruits and Vegetables Processing Hand Book.EIRI, Delhi.

Srivastava.P.R. and Sanjeev Kumar. Fruit and vegetable preservation - 3rd Edition. International Publishers, Delhi.

EIRI Board of Consultants and Engineers. Manufacture of Snacks, Namkeen, Papads and Potato products-EIRI.

Norman.N.Potter.Food Science.CBS publishers and distributors,New Delhi.

Joshi and Pandey. Biotechnology: Food Fermentation, Volume-II. Educational Publishing and Distributing Co.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – II
PAPER – III ON JOB TRAINING-I

Credits 1

Teaching Hours 2

On Job Training provides students adequate experience in planning and managing an enterprise in totality starting from procurement of raw material to processing, production, packaging and storage of products, organizing resources and utilities, sale of products, maintain accounts and analyze profits. Finally, students will present their work along with a report of their performance. The Report should contain following. Developing a Business Plan/ Project Proposal I Identification of the product to be manufactured ii Market Survey iii Analysis of the existing status of the identified product and targeted market and customer iv Innovativeness and Creativity v Preparation of the project proposal with supply chain of inputs, personnel plan, production plan, finance plan, etc. and its preparation Plan for the Production i Organization of resources ii Organizing utility iii Sequential grouping of activities iv Packaging and storage v Product pricing – physical inputs, man-hours, depreciation, etc. vi Time management Production i Regularity in production ii Adhering to production plan iii Product quality assessment iv Maintenance of production records v Team work Sales i Sales strategy ii Sales volumes iii Assessment of sales performance iv Profit generated including C/B ratio, payback period, etc. Documentation and Report Presentation & Evaluation ii Personnel Management ii Preparation of final report & Oral performance.

III SEMESTER

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – III
PAPER – I FOOD SCIENCE

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce the student about classification of foods	By the end of the course, student will be known about processing methods of foods
To impart knowledge on processing of wheat, rice and other legumes	Student will be able to choose different pretreatments to foods
To impart knowledge on concepts of processing parameters	Student will be able to understand processing importance of foods

Unit-1

Processing of foods: Primary, secondary and tertiary processing, historical perspective, traditional technologies used in food processing. B. Effects of processing on components, properties and nutritional value of foods.

Unit-2

Processing of wheat: Structure, composition, primary processing, functionality in food system, study of preparation/ manufacture of common unleavened and leavened products like chapathi, bread, cake etc.

Unit-3

A. Rice: Structure, composition, primary and secondary processing, rice processed products.
 B. Millets: Types, composition, malting, other food uses.

Unit-4

A. Legume:-Types, composition, milling, germination, cooking & processed products. B. Oilseeds: Use of oilseeds and oilseed meals, soya bean and groundnut - composition, processing and food uses.

Unit-5

Fruits and vegetables: Composition, pectins, plant acids, types of pigments, effect of cooking on colour and texture of vegetables.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – III
PAPER – I FOOD SCIENCE PRACTICAL

Credits 1

Teaching Hours 2

LIST OF EXPERIMENTS

Study of preparation variables and quality factors of products from the following food commodities.

Five Products for each matrix should be processed.

1. Wheat
2. Rice and millets
3. Legumes
4. Vegetables

Text Books

Srivastava.P.R. and Sanjeev Kumar. Fruit and vegetable preservation - 3rd Edition. International Publishers, Delhi.

Books for Reference

Giridharlal, Siddappa and Tandon. Preservation of fruits and vegetables.ICAR, New Delhi. Sudhir

Gupta (Compiled). Fruits and Vegetables Processing Hand Book.EIRI, Delhi.

Srivastava.P.R. and Sanjeev Kumar. Fruit and vegetable preservation - 3rd Edition. International Publishers, Delhi.

EIRI Board of Consultants and Engineers. Manufacture of Snacks, Namkeen, Papads and Potato products-EIRI.

Norman.N.Potter.Food Science.CBS publishers and distributors,New Delhi.

Joshi and Pandey. Biotechnology: Food Fermentation, Volume-II. Educational Publishing and Distributing Co.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – III
PAPER – II FOOD SAFETY AND MICROBIAL STANDARDS

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce the student about different types of microbes that invade foods	By the end of the course, student will be known about organization
To impart knowledge on history of food microbiology	Student will be able to identify different microorganisms in foods
To impart knowledge on concepts of food preservation and food spoilage	Student will be able to identify spoilage of foods

Unit-1

History of Food spoilage, Food poisoning, Food legislation and Food preservation. Dietary toxins - Food poisoning, Intoxication, Infection, Classification of toxins. Food borne bacterial toxins - *Clostridium botulinum*, *Clostridium perfringens*, *Staphylococcus* - Types of food involved - toxicity and symptoms - Chemical properties – Environmental conditions. Food borne bacterial toxins - *Salmonella*, *Vibrio*, *Escherichia coli*, five groups of *E.coli*, *Bacillus cereus*. Types of food involved - toxicity and symptoms - Chemical properties - Environmental conditions

Unit-2

Food borne bacterial toxins - *Listeria*, *Shigella*, *Yersinia*, *Campylobacter*, *Aeromonas*, *Brucella*, *Pleisiomonas*. Types of food involved - toxicity and symptoms - Chemical properties - Environmental conditions. Mycotoxins - Types of mycotoxins - Aflatoxins, Patulin, Penicillic acid, Ochratoxin, citrinin, Alternaria toxin - Types of food involved - toxicity and symptoms - Chemical properties -Environmental conditions. Mycotoxins - Sterigmatocystin, Fuminosins, Sambutoxin, Zeralenone, Ergotism, Cyclopiazonic acid, Rubratoxin, Satratoxin, Verrucaric acid, and Roridin, Tricothecenes, Roquefortine - Types of food involved - toxicity and symptoms-Chemical properties - Environmental conditions

Unit-3

Mushroom toxins, Different sps of poisonous mushrooms, Poisoning or disorders due to poisonous mushrooms. Control of mycotoxins in food and feed. Algal toxins - Paralytic shell fish poisoning, Ciguatera poisoning, Domoic acid, Tetrodo toxin, cyanobacterial toxins, Scombro toxic Fish poisoning, *Pfiesteria piscidia* - Types of food involved - toxicity and symptoms - Chemical properties - Environmental conditions. Food borne animal parasites - Protozoans - Giardiasis, Amebiasis, Toxoplasmosis, Sarcocystis, Cryptosporidiosis, Cyclosporiasis - Types of food involved - toxicity and symptoms - Chemical properties - Environmental conditions

Unit-4

Food borne animal parasites-Flat worms - Fascioliasis, Fasciolopsiasis, Paragonimiasis, Clonorchiasis, Diphyllbothriasis, Taeniasis, Round worms (Trichinosis, Anisakiasis) – Types of food involved - toxicity and symptoms - Chemical properties - Environmental conditions, Food borne viruses - Polio, Hepatitis A and E, Noroviruses, rota viruses, Prion Diseases - Types of food involved - toxicity and symptoms - Chemical properties – Environmental Conditions. Metals as toxins - Heavy metals - Arsenic - Occurrence - detection in foods – Toxicological effects - limits - Cadmium - Occurrence - detection in foods - Toxicological effects – limits- Mercury - Occurrence - detection in foods - Toxicological effects – limits

Unit-5

Pesticides - Chlorinated pesticides and non chlorinated pesticides - Decontamination of food commodities of their insecticide residues. Movement of Residues in the environment. Pesticides - Mechanisms of Toxicity-Residues in Food, Acceptable daily intakes, Maximum residue limits. Antinutrients - Toxic phenolic substances, Flavonoids, tannins, Coumarin - Toxicity and symptoms - Chemical properties(structure and stability) - Type of foods involved - Prevention

Text Book

P Tauro K. K. Japur and K.S. Yadav, An Introduction to Microbiology, Wiley Eastern Limited

Books for Reference

P Tauro K. K. Japur and K.S. Yadav, An Introduction to Microbiology, Wiley Eastern Limited, New Delhi.

C.B. Power and H.F. Dagainawala, General Microbiology, Himalaya Publishing House, Bombay.

Frazier, W.C. and Westhoff, D.C. IV Edn., Food Microbiology, Mc Graw Hill Inc, New Delhi, 1988.

Adam, M.R and Moss M.O, Food Microbiology, New Age International Pvt. Ltd, New Delhi.

Frazer, Math and Deibel, Laboratory Manual for Food Microbiology, Burgers Publishers, Minnesota, USA.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – III
PAPER – II FOOD SAFETY AND MICROBIAL STANDARDS PRACTICAL

Credits 1

Teaching Hours 2

List of Experiments

1. Estimation of bacterial toxins from food sample - I
2. Estimation of bacterial toxins from food sample - II
3. Estimation of bacterial toxins from food sample - III
4. Estimation of bacterial toxins from food sample - IV
5. Estimation of fungal toxins from food sample - I
6. Estimation of fungal toxins from food sample - II
7. Estimation of fungal toxins from food sample - III
8. Estimation of fungal toxins from food sample - IV
9. Detection of heavy metal from plant source
10. Detection of heavy metal from animal source - I
11. Detection of heavy metal from animal source - II
12. Risk assessment
13. Risk Management

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – III
PAPER – III EXTRUSION TECHNOLOGY

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
.To Introduce the student about classification of extruders	By the end of the course, student will be known about processing methods for snacks
To impart knowledge on processing of extruded snacks	Student will be able to identify sensory parameters for extruded products
To impart knowledge on concepts of extruded products processing	Student will be able to understand processing importance of extruded snacks

Unit -1

Extrusion : definition, introduction to extruders and their principles, types of extruders. Extruders in the food industry: History and uses of extruders in the food industry. Single screw extruder: principle of working, net flow, factors affecting extrusion process, co-kneaders. Twin screw extruder: counter rotating and co-rotating twin screw extruder

Unit-2

Process characteristics of the twin screw extruder : feeding, screw design, screw speed, screw configurations, die design. Twin screw extruder: Barrel temperature and heat transfer, adiabatic operation, heat transfer operations and energy balances Problems associated with twin screw extruder, Pre-conditioning of raw materials used in extrusion process, Pre-conditioning operations and benefits of pre-conditioning and devolatilization

Unit-3

Interpreted-flight expanders - extruders, dry extruders. Chemical and nutritional changes in food during extrusion, Practical considerations in extrusion processing: pre-extrusion processes, cooker extruder, Profiling Practical considerations in extrusion processing: Addition and subtraction of materials, shaping and forming at the die, post extrusion processes. Breakfast cereals: introduction, type of cooking - High shear cooking process, steam cookers, low shear, low pressure cookers and continuous steam pre-cooking, available brands

Unit-4

Breakfast cereal processes: traditional and extrusion methods, classification of breakfast cereals - flaked cereals, oven puffed cereals, gun puffed cereals, shredded products. Texturized vegetable protein: Definition, processing techniques, and foods. Snack food extrusion: Direct expanded (DX) and third generation (3G) Snacks: types, available brands, co- extruded snacks and indirect-expanded products

Unit-5

Study of factors affecting extrusion cooking – moisture content, diameter, temperature, pressure, screw speed, time. Study of factors affecting extrusion cooking – moisture content, diameter, temperature, pressure, screw speed, time. Quality evaluation of extruded products

Textbook

N.N. Potter, Food Science, III edition, AVI Publishing Co. Inc., West Port, USA, 1978.

Books for Reference

1. N.N. Potter, Food Science, III edition, AVI Publishing Co. Inc., West Port, USA, 1978.
2. Graft and Saguy, Food Product Development, CBS Publishers, New Delhi.
3. M. Swaminathan, Food and Nutrition, Vol I &II, The Bangalore Printing & Publishing Co. Ltd, Bangalore.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – III
PAPER-IV ON JOB TRAINING III

Credits 1

Teaching Hours 2

On Job Training provides students adequate experience in planning and managing an enterprise in totality starting from procurement of raw material to processing, production, packaging and storage of products, organizing resources and utilities, sale of products, maintain accounts and analyze profits. Finally, students will present their work along with a report of their performance. The Report should contain following. Developing a Business Plan/ Project Proposal I Identification of the product to be manufactured ii Market Survey iii Analysis of the existing status of the identified product and targeted market and customer iv Innovativeness and Creativity v Preparation of the project proposal with supply chain of inputs, personnel plan, production plan, finance plan, etc. and its preparation Plan for the Production i Organization of resources ii Organizing utility iii Sequential grouping of activities iv Packaging and storage v Product pricing – physical inputs, man-hours, depreciation, etc. vi Time management Production i Regularity in production ii Adhering to production plan iii Product quality assessment iv Maintenance of production records v Team work Sales i Sales strategy ii Sales volumes iii Assessment of sales performance iv Profit generated including C/B ratio, payback period, etc. Documentation and Report Presentation & Evaluation ii Personnel Management ii Preparation of final report & Oral performance.

IV SEMESTER

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – IV
PAPER – I VITAMINS IN NUTRITION

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce the student about different foods and vitamins	By the end of the course, student will be known about vitamins
To impart knowledge on history of vitamins	Student will be able to identify different Sources of Vitamins
To impart knowledge on concepts of processing of Vitamins	Student will be able to know importance of vitamins

Unit-1

Introduction- History, Definition of terms- requirements, RNI, UTNI, protective nutrient intake, food based approaches to meet the need for vitamins, physico-chemical properties, general functions, analytical methods and compositional data sources, ADME concept, bioavailability, factors affecting variations/losses of vitamins in food.

Unit-2

Classification- Fat soluble vitamins and Water soluble vitamins i. Water soluble vitamins Vitamin C, thiamin, riboflavin, niacin, pantothenic acid, biotin, folic acid.(Physicochemical properties, stability, biochemical indicators, factors affecting requirements).

Unit-3

Fat soluble vitamins Vitamin A- stability and modes of degradation, role in visual cycle, functions of carotenoids Vitamin D- Formation in the skin, photochemical regulation and factors affecting synthesis of vitamin D3 in human body, supplements.

Unit-4

Vitamin E – Vitamin E as a part of endogenous antioxidant system Vitamin K – Role in blood clotting process, anti-platelet aggregation, anti-clotting drugs (vitamin K- agonists and antagonists) Note: All nutrients to be dealt in the following sub headings apart from the topics mentioned above with respect to each vitamin.

Unit-5

History, forms of vitamins, tissue distribution, physiological functions, metabolism (ADME), units of expression, assessment of vitamin status and interpretation of values, RDA, deficiency and toxicity, dietary sources, factors affecting bioavailability, deficiency and toxicity, interactions with nutrients and drugs.

Text Book

Dr. Ling, H D Belitz, Dr. Ing, W. Grosch, Food Chemistry, Springer, New York, 1987.

Books for Reference

1. Dr. Ling, H D Belitz, Dr. Ing, W. Grosch, Food Chemistry, Springer, New York, 1987.
2. Braverman, Introduction to the Bio-Chemistry of Foods, Elsevier Scientific Publishing Company.
3. AOAC Methods for Food Analysis.
4. Meyer, Food Chemistry, AVI Publishing Company, USA 1983.
5. Sadasivam and Manickyam, Biochemical Methods, New Age International Publications, New Delhi, 1996.
6. John M. Deman, Principles of Food Chemistry, Springer International edition, Third edition, 2007.
7. Meenakshipaul, Experimental Food Chemistry, Published gene tech books New Delhi, 2012.
8. Fenema. R, Food Chemistry, Fourth edition, CRC Press Taylors and Francis group.
9. R.P.Srivastava and Sanjeev Kumar, Fruits and vegetables preservation, principles and practices, International Book Distribution Co. Third revised edition.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – IV
PAPER – I VITAMINS IN NUTRITION PRACTICAL

Credits 1

Teaching Hours 2

List of Experiments

- a) Determination of moisture, Ash - total, acid soluble and insoluble.
- b) Determination of Protein in foods.
- c) Determination of Fat – Crude fat.
- d) Carbohydrates – Free sugars, Starch (Total & available), Dietary fiber.
- e) Mineral estimation – Dry and wet ashing, calcium, iron, phosphorous.
- f) Vitamin estimation – Ascorbic acid, thiamine, riboflavin and β carotene.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – IV
PAPER-II TECHNIQUES IN FOOD ANALYSIS

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce the student about different chemical structures in foods	By the end of the course, student will understand qualitative analysis
To impart knowledge on analytical techniques	Student will be able to know procedures for analysis
To impart knowledge on standards of different foods	Student will be able to understand the importance of standards and their evaluation

Unit-1

Introduction to the chemical analysis of food - Definitions of food analysis, Quality control, Official methods of analysis. Association of Official Analytical Chemists, American Association of Cereal Chemists, American Oil Chemists Society, Rules and Regulations of Food Analysis, Nutritional Labelling , Food Inspection and Grading, food safety - Safety rules in the chemistry- Safety rules - What to do in case of an accident - Broken Glass - Small chemical spill - Large chemical spill - Chemical splash in your face - Large splash of dangerous chemical on your clothing and or body, small confined fire, small open fire, large fire, your clothing on fire

Unit-2

First Aid -Thermal burns, chemical burns, minor bleeding, toxic fumes, fainting and shock, chemical splashes. Sampling and Sampling Techniques - Introduction - Definitions of Population, Laboratory. Sample, sample, precision, accuracy, sensitivity, Reproducibility - of Analysis – Official Samples, Raw Materials. Basic principles of spectrophotometer and colorimeter and its application Analysis of Carbohydrates - Introduction - Importance of Carbohydrate Analysis – Methods of Analysis - Sample preparation - Extraction of Monosaccharides, Oligo saccharides

Unit-3

Chemical methods for carbohydrates - Gravimetric methods - Titrimetric methods - Colorimetric methods - phenol sulfuric acid - Enzymatic methods. Physical methods - Polarimetric method, Refractive index measurements, Density, Infrared radiation, Immuno assays, Analysis of starch and crude fibre Analysis of proteins - Introduction - Importance of protein analysis - Determination of overall protein concentration by Kjeldhal method, Enhanced Dumas method, using U.V Visible spectroscopy. Direct measurement at 280 nm, Biuret method, Lowry method, Dye binding method, Turbido metric method

Unit-4

Protein and characterisation - Basic principles of chromatography - types of chromatography and its applications. Analysis of lipids - Introduction - Importance of analysis of lipids - Determination of total lipid concentration - solvent extraction. Extraction of lipids - solvent, Non solvent extraction methods, instrumentation methods

Unit-5

Determination of lipid composition - Separation and analysis by chromatography – lipids fractions of TLC - Fatty acid methyl esters by GC - Chemical techniques - acid value, instrumental techniques of analyzing lipid oxidation in foods - Chromatography, peroxide value - Characteristics of physico chemical properties Analysis of minerals - Introduction - Importance of mineral analysis - Dry ashing – Wet ashing - Low plasma ashing, Adsorption spectroscopy

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – IV
TECHNIQUES IN FOOD ANALYSIS PRACTICAL

Credits 1

Teaching Hours 2

List of Practicals

1. Introduction to Food Analysis Techniques
2. Preparation of solutions
3. Preparation of Buffers
4. Preparation of standard graph
5. Sampling techniques and methods of sample preparation
6. Colorimetry and spectrophotometry
7. Determination of pH of Food samples (milk, flours, jams)
8. Determination of Titratable acidity
9. Determination of Moisture and Total solids
10. Estimation of carbohydrates by Phenol Sulphuric Acid method
11. Test for adulterants in Sugar, Jaggery, Honey
12. Test for adulterants in Milk, Ghee
13. Test for adulterants in plantation crops (Tea, coffee) and Turmic
14. Test for adulterants in spices (Cardamom, cloves, pepper)

Text Books

Mano Ranjan Kalia First Edition 2002, Food Analysis and Quality Control. Kalyani Publishers, New Delhi, Hyderabad.

Books for Reference

S.S. Nilson, Food Analysis, Aspen Publishers, Gaithery Berg, Mary Land. AOAC methods For Food Analysis.

Y. Pomeranz and C.E. Meloan, Food Analysis, Theory and practice, A.V.I Publishing Company, INC West Port, Connecticut, U.S.A.,

Jayaraman, J. 1980. Laboratory Manual in Biochemistry. Wiley Eastern Publishers, New Delhi.
Plummer, D.T. 1979. An introduction to Practical Biochemistry. Tata Mc Graw-Hill Publishing Co., New Delhi.

Sadasivam, S. and Manickam, A. 1996. Biochemical methods for Agricultural Sciences. New Age International Publisher, New Delhi.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester –IV
PAPER – III FOOD ADDITIVES

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce the student about different foods and their processing ingredients	By the end of the course, student will understand importance of ingredients and food additives relation
To impart knowledge on food additives	Student will be able to know regulations on food additives
To impart knowledge on safety of food additives	Student will be able to know acceptable daily intakes of different food additives

Unit – 1

Introduction: What are Food Additives? - Role of Food Additives in Food Processing - functions - Classification - Intentional & Unintentional Food Additives. Toxicology and Safety Evaluation of Food Additives - Beneficial effects of Food Additives / Toxic Effects - Food Additives generally recognized as safe (GRAS) - Tolerance levels & Toxic levels in Foods - LD 50. Values of Food additives. Naturally occurring Food Additives - Classification - Role in Food Processing – Health Implications

Unit-2

Preservatives - What are preservatives - natural preservation- chemical preservatives – their chemical action on foods and human system. Anti-oxidants & chelating agents - what are anti oxidants - their role in foods - types of antioxidants- natural & synthetic - examples - what are chelating agents - their mode of action in foods - examples. Surface active agents - What are surface active agents - their mode of action in foods -examples.

Unit-3

Bleaching & maturing agents: what is bleaching - Examples of bleaching agents - what is maturing - examples of maturing agents - their role in food processing. Starch modifiers: what are starch modifiers - chemical nature - their role in food processing. . Food colors - What are food colors - Natural Colours and classification

Unit-4

Buffers - Acids & Alkalis - examples - types - their role in food processing. Sweeteners - what are artificial sweeteners & non nutritive sweeteners - special dietary supplements & their health implication - role in food processing. Food Colors - Synthetic food colors - types - their chemical nature - their impact on health.

Unit-5

Flavoring agents - natural flavors & synthetic flavors - examples & their chemical nature - role of flavoring agents in food processing. Anti-caking agents - their role in food processing . Humectants - definition on their role in food processing. Clarifying agents - definition examples - their role in food processing.

Textbook

Srivastava, R.P. Fruit & Vegetable Preservation – Principles and Practices. International Book Distributing Co. CIBDC, New Delhi.

Book for Reference

Belitz . Food Chemistry . 3rd Revised Edition. Springer International.

Deshpande , S.S. Hand book of Food Toxicology. Marcel and Dekker .CRC Publishers.

Mahindru , S.N. Food Additives – Characteristics, Detection and Estimation .Tata McGraw Hill Publishing, India.

Shakuntala Manay and Shadakshar Swamy. Food Facts and Principles. New Age International Publishers, New Delhi.

Srivastava, R.P. Fruit & Vegetable Preservation – Principles and Practices. International Book Distributing Co. CIBDC, New Delhi.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – IV
PAPER – III FOOD ADDITIVES PRACTICAL

Credits 4

Teaching Hours 4

List of Experiments

1. Estimation of chemical preservatives by TLC (organic)
2. Estimation of chemical preservatives by TLC (inorganic)
3. Identification of food colours by TLC (Permitted)
4. Identification of food colours by TLC (Non-permitted)
5. Estimation of chlorophyll.
6. Quantitative estimation of added dyes in foods (permitted)
7. Quantitative estimation of added dyes in foods (non permitted)
8. Estimation of Antioxidants in foods (BHA, BHT)
9. Estimation of Antioxidants in foods (Propylgallates)

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – IV
PAPER –IV BASIC RESEARCH METHODOLOGY IN NUTRITION

Credits 4

Teaching Hours 4

OBJECTIVES	LEARNING OUTCOMES
To Introduce the student about Research Methodology	By the end of the course, student will be known about research methodology
To impart knowledge on data knowledge	Student will be able to interpret data
To impart knowledge on concepts of Interpretation of data	Student will be known about sampling design

Unit-1

Research Methodology- Meaning, objectives and Significance of research. Types of research, research approaches and scientific methods. Research process and criteria of good research. Definition and identification of a research problem- Selection of research problem, Justification, development of hypothesis, basic assumptions. Limitations and delimitations of the problem.

Unit-2

Research design- Meaning and needs, Features of a good design, important concepts relating to research design, variables, experimental and control groups. (Use examples from epidemiology and clinical trials). Different research designs- exploratory, descriptive and diagnostic (epidemiology and clinical trials). Pilot studies. Qualitative vs quantitative research. Sampling design- Population and sample, Steps in sampling design, Criteria for selecting a sampling procedure, Different types of sampling techniques- probability sampling and non probability sampling. Merits and demerits of sampling. Power analysis and sample size calculation in experimental design.

Unit-3

Methods of data collection- Schedules and questionnaires; Interview, Case study, Home visits, scaling methods, Reliability and validity of measuring instruments. Statistical issues: effect of measures- formulation of hypothesis and testing of hypothesis, Confidence level and Bayesian statistics. Concepts and characteristics of a normal distribution.

Unit-4

Basic principles and regulations in humans and animal research. Analysis and reporting of data. Graphical and diagrammatic presentation, Measures of central tendencies (Mean, median and mode), Measure of dispersion (Range, Mean deviation and standard deviation) and their relative measures.

Unit-5

Qualitative and quantitative methods of data analysis. b. Interpretation of – Meaning of interpretation, Technique of interpretation, c. Precaution in interpretation- Interpretation of tables and figures. d. Report writing – Significance of report writing, Different steps in writing report, Types of reports, Mechanics of writing reports and precautions to be taken while writing research

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – IV
PAPER – IV ON JOB TRAINING

Credits 1

Teaching Hours 2

OBJECTIVES	LEARNING OUTCOMES
To Introduce about different job roles in industry	By the end of the course, student will be given a brief idea of setting a small scale food processing industry
To impart knowledge food formulation, processing, evaluation	Student will be able to formulate and process different types of foods
To impart knowledge on marketing of processed foods	Student will be able to identify practical problems during processing of different foods

On Job Training provides students adequate experience in planning and managing an enterprise in totality starting from procurement of raw material to processing, production, packaging and storage of products, organizing resources and utilities, sale of products, maintain accounts and analyze profits. Finally, students will present their work along with a report of their performance. The Report should contain following. Developing a Business Plan/ Project Proposal I Identification of the product to be manufactured ii Market Survey iii Analysis of the existing status of the identified product and targeted market and customer iv Innovativeness and Creativity v Preparation of the project proposal with supply chain of inputs, personnel plan, production plan, finance plan, etc. and its preparation Plan for the Production i Organization of resources ii Organizing utility iii Sequential grouping of activities iv Packaging and storage v Product pricing – physical inputs, man-hours, depreciation, etc. vi Time management Production i Regularity in production ii Adhering to production plan iii Product quality assessment iv Maintenance of production records v Team work Sales i Sales strategy ii Sales volumes iii Assessment of sales performance iv Profit generated including C/B ratio, payback period, etc. Documentation and Report Presentation & Evaluation ii Personnel Management ii Preparation of final report & Oral performance.

5. Model Question Paper (Sem-end, Exam)

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester I
PAPER – 1 FOOD PRODUCTION TRENDS AND BSSIC NUTRITION

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any **FIVE** questions. Each question carries equal marks. (5 x 5 = 25)

1. Write about Post Harvest losses in foods.
2. What is the Scope for Expansion of Indian Food Industry?
3. Write about Classification of Foods.
4. Explain in detail about Food laws and Factors effecting Food Laws.
5. Write about World Food Day and its importance.
6. Explain different National and International Projects related to Food Industry.
7. Write about Reasons for Slow growth of Food Industry.
8. Write about Classification of Food Crops.

SECTION – B

Answer **All** the questions. Each question carries **TEN** marks (5 x 10 = 50)

9. a) Write in detail about Scope, Future Priorities and Interdependence of Indian Food Processing Industry.

(OR)

b) Write about the Status of Food Processing Industries in India and Abroad.

10. a) Explain the Status of Dairy sector in India.

(OR)

b) Explain the Status of Beverage and Snack Food Industry in India

11. a) Explain MOFPI.

(OR)

b) Write about APEDA.

12. a) Write about Convenience Foods in detail.

(OR)

b) Explain Functional Foods in detail.

13. a) What are different Developmental Programmes and Strategies adopted to eliminate food losses?

(OR)

b) Write about Global Demand for Food. Write about Scope for Future Expansion of Food Industry in India and Abroad.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – I
FOOD PRODUCTION TRENDS AND BASIC NUTRITION
PRACTICAL QUESTION PAPER

Time: 3 Hours

Maximum: 50 Marks

SECTION A

I. Major Experiment – 40 M

Procedure – 10M

Ingredients – 5 M

Records – 5M

Processing -5M

Result and Inference-10M

Viva voice-5M

II Minor Experiment – 10 M

Total Marks: 50 Marks

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester - I
PAPER – II FOOD AND NUTRITION

Time: 3 Hours

Maximum:75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. Write about BMI and its relation to health.
2. Write about food pyramid.
3. Write about Food groups.
4. Explain in detail water soluble vitamins.
5. Write about essential minerals.
6. Explain concept of meal planning.
7. Write about balanced diet concept.
8. Write about Nutritional Labelling.

SECTION – B

Answer **All** the questions. Each question carries **TEN** marks (5X10 = 50)

9. a) Write in detail about meal planning concept for different foods.

(OR)

- b) Write about vitamins.

10. a) Explain methods of cooking.

(OR)

- b) Explain labelling of foods.

11. a) Explain minerals in foods.

(OR)

- b) Write about sources of vitamins in different foods.

12. a) Write about nutrients in foods

(OR)

- b) Explain guidelines of FSSAI for nutritional labeling

13. a) Write about functions of FSSAI

(OR)

- b) Write about balanced diet concept

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – I
PAPER – I FOOD AND NUTRITION
PRACTICAL QUESTION PAPER

Time: 3 Hours

Maximum: 50 Marks

1. Plan a balanced diet for 15 to 22 age group

Procedure – 10 M

Ingredients – 10 M

Processing 10 M

Result and Inference-10 M

Viva voice-10 M

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Technology
2020-21 Admitted Batch
I Year Semester – I
PAPER- III PRINCIPLES OF FOOD PRESERVATION

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. Write about types of food spoilage.
2. Write about blanching and sterilization of foods.
3. Write about Canning of Foods.
4. Explain in detail about Fluidized bed dryer.
5. Write about Class I Preservatives.
6. Explain HPP.
7. Write about Infra Red heating.
8. Write about Irradiation.

SECTION – B

Answer all the questions. Each question carries TEN marks (5X10 =50)

9. a) Write in detail about preservation by Thermal processing.
(OR)
- b) Write about Dehydration of foods.
10. a) Explain Class –I and Class – II preservatives.
(OR)
- b) Explain Drying and Dehydration Phenomenon in foods.
11. a) Explain MOFPI.
(OR)
- b) Write about APEDA.
12. a) Write about PEF and HPP Processing of Foods
(OR)
- b) Explain different steps in Canning of Foods
13. a) Write about Dielectric heating and ohmic heating in detail.
(OR)
- b) Write about different changes seen in foods during

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – I
PAPER – III ON JOB TRAINING-1

Components for Evaluation	Maximum Marks
Market survey	10
Documentation	10
Processing and marketing	20
Seminar	10

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Technology
2020-21 Admitted Batch
I Year Semester – II
PAPER- I PRODUCT DEVELOPMENT AND FORMULATION

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. What are the components of Product Development
2. Define new food product
3. What is reformulation
4. what is the difference between market and market place
5. What is meant by profit picture
6. What are the sources of new product ideas
7. What is standardization of product
8. what is market testing

SECTION – B

Answer all the questions. Each question carries TEN marks (5X10 =50)

9. a) What is Market testing? Give methods for market testing?
(OR)
- b) What are the different criteria for screening?
10. a) What is the role of engineering in product development?
(OR)
- b) What are market functions. Elaborate.
11. a) How to organize a new product development idea?
(OR)
- b) What are perceived needs of market
12. a) What is meant by consumer trial and preferences?
(OR)
- b)
13. a) What is product life cycle? What are characteristics of product?
(OR)
- b) What are the methods of data collection?

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – II
PAPER – I PRODUCT DEVELOPMENT AND FORMULATION
PRACTICAL QUESTION PAPER

Time: 3 Hours

Maximum: 50 Marks

SECTION A

I. Major Experiment – 40 M

Procedure – 10M

Ingredients – 5 M

Records – 5M

Processing -5M

Result and Inference-10M

Viva voice-5M

II Minor Experiment – 10 M

Total Marks: 50 Marks

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Technology
2020-21 Admitted Batch
I Year Semester – II
PAPER- II FUNDAMENTALS OF CLINICAL NUTRITION

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. Define clinical nutrition and dietetics
2. What is the relation ship between food, nutrition and health.
3. What are neurotransmitters
4. What are types of food service
5. What is nutritional care plan
6. What is somatic and biological assessment
7. What are dietary guidelines for Indians
8. What is meant by parenteral feeding?

SECTION – B

Answer all the questions. Each question carries TEN marks (5X10 =50)

9. a) Write in detail about protein and energy malnutrition
(OR)
- b) write about nutrient deficiencies
10. a) What is the role of dietician in hospitals
(OR)
- b) What are different principles of planning a normal diet
11. a) How to maintain medical records and give their uses
(OR)
- b) How to develop nutritional careplan?
12. a) What is the importance of nutrition and health in human daily life.
(OR)
- b) What are the objectives of diet therapy
13. a) What are Enteral and Parenteral feedings?
(OR)
- b) What is the diet for patients in special conditions?

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – II
PAPER – II FUNDAMENTALS OF CLINICAL NUTRITION
PRACTICAL QUESTION PAPER

Time: 3 Hours

Maximum: 50 Marks

SECTION A

I. Major Experiment – 40 M

Procedure – 10M

Ingredients – 5 M

Records – 5M

Processing -5M

Result and Inference-10M

Viva voice-5M

II Minor Experiment – 10 M

Total Marks: 50 Marks

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Technology
2020-21 Admitted Batch
I Year Semester – II
PAPER- III BASIC DIETETICS

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. Give types of diets
2. Give diet for obesity
3. Write about anorexia
4. What is the importance of dietary counseling?
5. How to educate patients regarding diet
6. What is meant by immune dysfunction
7. What is diet for kidney diseases
8. What is diet for burns.

SECTION – B

Answer all the questions. Each question carries TEN marks (5X10 =50)

9. a) What is the psychology behind feeding the patients
(OR)
- b) Give diet for chronic diseases
10. a) Give diet chart for addictive behaviors
(OR)
- b) Give diet chart for diabetes mellitus
11. a) Give diet chart for burns and surgery
(OR)
- b) Give diet for obesity and cardiovascular diseases
12. a) What is the role of dietecian in hospital and Community.
(OR)
- b) Write about basic concepts behind therapeutic nutrition
13. a) Give diet chart for infection conditions
(OR)
- b) Give diet chart for Immune system dysfunction.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – II
PAPER III ON JOB TRAINING-II

Components for Evaluation	Maximum Marks
Market survey	10
Documentation	10
Processing and marketing	20
Seminar	10

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Technology
2020-21 Admitted Batch
II Year Semester – III
PAPER- I FOOD SCIENCE

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. What is meant by tertiary processing?
2. What are millets?
3. What are legumes?
4. What is the composition of fruits?
5. What are the uses of oilseeds?
6. What are pectins?
7. What are types of pigments?
8. Give types of milling

SECTION – B

Answer all the questions. Each question carries TEN marks (5X10 =50)

9. a) Write about composition and milling procedures of millets

(OR)

b) Write about uses of oilseeds and oilseed meals

10. a) Write about composition and milling procedures of Wheat.

(OR)

b) Write about composition and milling procedures of Rice

11. a) Write about composition and milling procedures of Legumes.

(OR)

b) Write about effects of processing on composition and nutritional values of foods.

12. a) Write manufacturing process of bread.

(OR)

b) Write manufacturing process of cake.

13. a) Write about processing of foods.

(OR)

b) Write about processing oilseeds.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – III
PAPER – I FOOD SCIENCE
PRACTICAL QUESTION PAPER

Time: 3 Hours

Maximum: 50 Marks

2. Plan a balanced diet for 15 to 22 age group

Procedure – 10 M

Ingredients – 10 M

Processing 10 M

Result and Inference-10 M

Viva voice-10 M

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Technology
2020-21 Admitted Batch
II Year Semester – III
PAPER- II FOOD SAFETY AND MICROBIAL STANDARDS

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. What is the history of food spoilage?
2. Classify toxins.
3. What is food borne bacterial toxins?
4. What are mushroom toxins?
5. What are food borne animal parasites?
6. What are heavy metals?
7. What are flavanoids?
8. What are pesticides?

SECTION – B

Answer all the questions. Each question carries TEN marks (5X10 =50)

9. a) What are Anti nutrients? Explain in detail
(OR)
- b) Write about food borne animal parasites
10. a) Write about pesticides
(OR)
- b) Write about *Listeria, Shigella and Yersinia*
11. a) Write about mycotoxins.
(OR)
- b) Write about toxicities of different foods.
12. a) How to control mycotoxin production in foods
(OR)
- b) Write about poisonous mushrooms.
13. a) What are dietary toxins?
(OR)
- b) What are pesticides? Write about pesticide residues?

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – II
PAPER – II FOOD SAFETY AND MICROBIAL STANDARDS
PRACTICAL QUESTION PAPER

Time: 3 Hours

Maximum: 50 Marks

3. Plan a balanced diet for 15 to 22 age group

Procedure – 10 M

Ingredients – 10 M

Processing 10 M

Result and Inference-10 M

Viva voice-10 M

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Technology
2020-21 Admitted Batch
II Year Semester – III
PAPER- III EXTRUSION TECHNOLOGY

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. Define Extrusion and give types of extruders
2. What are Co- kneaders?
3. Give principle for twin screw extruder.
4. What are breakfast cereals? Exemplify them.
5. Write about pre extrusion process.
6. Classify breakfast cereals
7. What are 3G snacks?
8. Write about snack food Extrusion.

SECTION – B

Answer All the questions. Each question carries TEN marks (5X10 = 50)

9. a) What is extrusion. Give design of Twin screw extruder
(OR)
b) Write about nutritional changes in extruded products
10. a) Describe High shear Cooking Process.
(OR)
b) What is TVP. Give its manufacturing process.
11. a) What are DX and 3G snacks. Give their manufacturing process
(OR)
b) What are the factors effecting extrusion cooking?
12. a) Write about Quality evaluation of extruded products
(OR)
b) Write about pre conditioning of raw materials used in extrusion process
13. a) Write about history and uses of extruders in food Industry
(OR)
b) Write about manufacturing process of breakfast cereals

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – III
PAPER III ON JOB TRAINING-II

Components for Evaluation	Maximum Marks
Market survey	10
Documentation	10
Processing and marketing	20
Seminar	10

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Technology
2020-21 Admitted Batch
II Year Semester – IV
PAPER- I VITAMINS IN NUTRITION

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. What is RNI and UTNI?
2. What is protective nutrient Intake?
3. What is ADME Concept?
4. What are Fat soluble Vitamins?
5. What are water soluble vitamins?
6. Write about Vitamin D3?
7. Write about Vitamin E?
8. What are dietary sources of vitamins?

SECTION – B

Answer all the questions. Each question carries TEN marks (5X10 =50)

9. a) Write about history, evolution of vitamins and distribution.
(OR)
- b) Classify about fat soluble vitamins.
10. a) Classify about Water soluble vitamins
(OR)
- b) What are carotenoids?
11. a) Write about Vitamin K and uses
(OR)
- b) What are the factors effecting the bioavailability of vitamins?
12. a) Write about ADME and units of vitamins.
(OR)
- b) What are analytical methods and data sources?
13. a) What are bio chemical indicators?
(OR)
- b) Write about photochemical regulation of Vitamin D.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – IV
PAPER – I VITAMINS IN NUTRITION
PRACTICAL QUESTION PAPER

Time: 3 Hours

Maximum: 50 Marks

SECTION A

I. Major Experiment – 40 M

Procedure – 10M

Ingredients – 5 M

Records – 5M

Processing -5M

Result and Inference-10M

Viva voice-5M

II Minor Experiment – 10 M

Total Marks: 50 Marks

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Technology
2020-21 Admitted Batch
II Year Semester – IV
PAPER- II TECHNIQUES IN FOOD ANALYSIS

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. Why food analysis is important in food industries?
2. Write about sampling techniques
3. Write about principle of spectrophotometer
4. Explain in detail about polarimeter
5. Write about Ashing methods.
6. Explain about gas chromatography.
7. Write about peroxide values
8. Give the list of lipid analysis techniques

SECTION – B

Answer All the questions. Each question carries TEN marks (5X10 = 50)

9. a) Write in detail about chromatographic techniques
(OR)
b) Write about methods of analysis of lipids
10. a) Explain about carbohydrates analysis
(OR)
b) Explain about gravimetric methods for analysis
11. a) Explain about calorimetric methods
(OR)
b) Write about Irradiation.
12. a) Write about U V visible spectrophotometer
(OR)
b) Explain about Protein characterization
13. a) Write about methods of protein analysis
(OR)
b) Write about Analysis of Minerals

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – IV
PAPER – II TECHNIQUES IN FOOD ANALYSIS
PRACTICAL QUESTION PAPER

Time: 3 Hours

Maximum: 50 Marks

SECTION A

I. Major Experiment – 40 M

Procedure – 10M

Ingredients – 5 M

Records – 5M

Processing -5M

Result and Inference-10M

Viva voice-5M

II Minor Experiment – 10 M

Total Marks: 50 Marks

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester – IV

FOOD ADDITIVES

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. Define Food Additives. What is the role of Food additives in Food Processing
2. Write a short note on GRAS.
3. Write about Chelating agents
4. Explain in detail about Nutritive Sweeteners.
5. Write about Clarifying Agents
6. Explain mode of action of Surfactants in foods.
7. List out different Food Additives
8. Write about Alkalis used in Food processing.

SECTION – B

Answer All the questions. Each question carries TEN marks (5X10 = 50)

9. a) Write in detail about Flavouring Agents used in Food Processing
(OR)
b) Write about Humectants.
10. a) Discuss Sweeteners used in Food Industries.
(OR)
b) Discuss Food Colours
11. a) Explain Starch modifiers
(OR)
b) Write a note on Antioxidants
12. a) Write about Chemical Preservatives used in Foods
(OR)
b) Explain different Food additives along with their EU numbers.
13. a) Classify Food Additives.
(OR)
b) What is the Role of Food Additives in Processing

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
I Year Semester – IV
PAPER – IV FOOD ADDITIVES
PRACTICAL QUESTION PAPER

Time: 3 Hours

Maximum: 50 Marks

SECTION A

I. Major Experiment – 40 M

Procedure – 10M

Ingredients – 5 M

Records – 5M

Processing -5M

Result and Inference-10M

Viva voice-5M

II Minor Experiment – 10 M

Total Marks: 50 Marks

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Technology
2020-21 Admitted Batch
II Year Semester – IV
PAPER- V BASIC RESEARCH METHODOLOGY IN NUTRITION

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5X5 = 25)

1. What is research methodology?
2. Write about procedure to identify research problem.
3. Write about research design.
4. What are steps in sampling design?
5. Write about characteristics of normal distribution.
6. Write about report writing.
7. What are the precautions to be taken while research?
8. How to interpret tables for research?

SECTION – B

Answer all the questions. Each question carries TEN marks (5X10 =50)

9. a) Write about sampling design.
(OR)
- b) What are different research designs?
10. a) Write about methods of data collection
(OR)
- b) What are Measures of central tendencies?
11. a) Write are measures of dispersion?
(OR)
- b) Write about report writing?
12. a) Write about data Interpretation.
(OR)
- b) What are basic principles and regulations in human and animal research?
13. a) Write about graphical and diagrammatic representation in food Analysis.
(OR)
- b) Write about power analysis and sample size calculation in experimental designs.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: Food Science and Nutrition
2020-21 Admitted Batch
II Year Semester –IV
ON JOB TRAINING-II

Components for Evaluation	Maximum Marks
Market survey	10
Documentation	10
Processing and marketing	20
Seminar	10