BACHELOR OF SCIENCE FOOD SCIENCE AND NUTRITION REGULATIONS

ELIGIBILITY

A candidate who has passed in Higher Secondary Examination with any Academic stream or Vocational stream as one of the subject under Higher Secondary Board of Examination and as per the norms set by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the Academic Council, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the **Bachelor of Science in Food Science And Nutrition Degree Examination** of this College after a course of study of three academic years.

OBJECTIVE OF THE COURSE

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

1. To provide basic knowledge and practice to enhance the quality of life though the improvement of human health and nutritional status.
2. To enable the students to implement the basic food science in operation
3. To develop skill and techniques in food preparation with conservation of nutrients and palatability using cooking methods generally employed
4. To help the students to contribute proper utilization of foods and prevent wastes.
5. To understand the prevalence of malnutrition in our Country and gain knowledge on effective methods to combat malnutrition

SCHEME OF EXAMINATIONS

Subject Code	Subject	Hrs of Instruction	Max Marks				Credit Points
			Exam Duration (Hrs)	CA	CE	Total	
FIRST SEMESTER-							
Part - I							
15UTL11U 15UHL11H 15UML11M 15UFL11F	Language-I Hindi-I Malayalam-I French-I	6	3	25	75	100	4
Part - II							
15UEG12E	English-I	6	3	25	75	100	4
Part - III							
15UFN13A	**Core- I:**Basic Food Science	5	3	25	75	100	4
15UFN13B	**Core –II:** Food Chemistry	3	3	20	55	75	3
15UFN13P	**Core Practical- I:** Food Science	3	3	20	30	50	2
15UCY1AA	**Allied–I:** Chemistry -I	3	3	20	55	75	3
	Allied Practical- I: Chemistry -I	2	-	-	-	-	-
Part - IV							
15UFC1FA	Environmental Studies	2	3	-	50	50	2
		30				**550**	**22**
SECOND SEMESTER-							
Part - I							
15UTL21U 15UHL21H 15UML21M 15UFL21F	Language-II Hindi-II Malayalam-II French-II	6	3	25	75	100	4
Part - II							
15UEG22E	English-II	6	3	25	75	100	4
Part - III							
15UFN23A	**Core –III:** Human Physiology	5	3	25	75	100	4
15UFN23B	**Core -IV:** Principles of Nutrition	6	3	25	75	100	4
15UCY2AA	**Allied - II:** Chemistry- II	3	3	20	55	75	3
15UCY2AP	**Allied Practical –I:** Chemistry- I	2	3	40	60	100	4

Part - IV							
15UFC2FA	**Value Education :** Human Rights	2	3	-	50	50	2
		30				**625**	**25**
THIRD SEMESTER-							
Part - I							
15UTL31U 15UHL31H 15UML31M 15UFL31F	Language-III Hindi-III Malayalam-III French-III	5	3	25	75	100	4
Part - II							
15UEG32E	English-III	5	3	25	75	100	4
Part - III							
15UFN33A	**Core –V:** Nutrition in Health	5	3	25	75	100	4
15UFN33P	**Core Practical –II:** Nutrition in Health	3	3	20	55	75	3
15UBC3AA	**Allied - III:** Biochemistry	4	3	20	55	75	3
Part - IV							
15UFN3SA	**Skill Based Subject -I :** Basic Computer Science in Nutrition	4	3	20	30	50	2
	NMEC- I	2	3	-	50	50	2
15UFC3FA 15UFC3FB/ 15UFC3FC/ 15UFC3FD 15UFC3FE	Tamil/ Advanced Tamil(OR) Yoga for Human Excellence/ Women's Rights/ Constitution of India	2	3	-	50	50	2
		30				**600**	**24**
FOURTH SEMESTER-							
Part - I							
15UTL41U 15UHL41H 15UML41M 15UFL41F	Language-IV Hindi-IV Malayalam-IV French-IV	5	3	25	75	100	4
Part -II							
15UEG42E	English-IV	5	3	25	75	100	4
Part - III							
15UFN43A	**Core –VI:** Dietetics	6	3	25	75	100	4
15UBC4AA	**Allied - IV:** Biochemistry	4	3	20	55	75	3

15UBC4AP	**Allied Practical –II:** Biochemistry	3	3	20	30	50	2
Part - IV							
15UFN4SP	**Skill Based Practical -I :** Dietetics	3	3	20	30	50	2
	NMEC- II	2	3	-	50	50	2
15UFC4FA/ 15UFC4FB/ 15UFC4FC/	Tamil/Advanced Tamil(OR) General Awareness	2	3	-	50	50	2
		30				**575**	**23**
FIFTH SEMESTER-							
Part - III							
15UFN53A	**Core- VII:** Food Preservation	6	3	25	75	100	4
15UFN53B	**Core- VIII:** Food Microbiology	6	3	25	75	100	4
15UFN53C	**Core- IX:** Food Processing	5	3	25	75	100	4
15UFN53D	**Core- X:** Fundamentals of Functional Foods and Neutraceuticals	6	3	25	75	100	4
	Elective – I	4	3	25	75	100	4
Part - IV							
15UFN5SP	**Skill Based Practical – II**: Food Preservation and Quality Control	3	3	20	30	50	2
		30				**550**	**22**
SIXTH SEMESTER-							
Part III							
15UFN63A	**Core – XI:** Community Nutrition	6	3	25	75	100	4
15UFN63B	**Core –XII:** Food Service Management	6	3	25	75	100	4
15UFN63P	**Core Practical - III:** Nutrition	3	3	25	75	100	4
	Elective – II	6	3	25	75	100	4
	Elective – III	6	3	25	75	100	4
Part - IV							
15UFN6SP	**Skill Based Practical-III:** Food Product Development	3	3	20	30	50	2

Part - V							
15UEX65A	Extension Activity	-		50	-	50	2
		30				**600**	**24**
GRAND TOTAL						**3500**	**140**

ELECTIVE – I

(Student shall select any one of the following subject as Elective in fifth SEMESTER-)

S. No	Subject Code	Name of the Subject
	15UFN5EA	Food Safety and Quality Control
2	15UFN5EB	Food Hygiene and Sanitation
3	15UFN5EC	Bakery

ELECTIVE – II

S. No	Subject Code	Name of the Subject
1.	15UFN6EA	Post Harvest Technology
2.	15UFN6EB	Quantity Food Service and Physical Facilities
3.	15UFN6EC	Health and Fitness

ELECTIVE – III

S. No	Subject Code	Name of the Subject
1.	15UFN6ED	Clinical Nutrition and Counseling
2.	15UFN6EE	Hospital Food Service
3.	15UFN6EF	Food Packaging

NON MAJOR ELECTIVE COURSES (NMEC)

The Department offers the following two papers as Non Major Elective Course for other than the Nutrition and Dietetics students.

Student shall select the following subject as Non Major Elective Course during their third and fourth SEMESTER-

S. No	NMEC	Subject code	Name of the subject
1	I	15UED34G	Nutrition in Health and Fitness
2	II	15UED44G	Food Preservation

Total Credit Distribution

Subjects	Credits	Total		Credits	Cumulative Total
Part I: Tamil	4	4 x 100 =	400	16	32
Part II: English	4	4x 100 =	400	16	
Part III:					
Core	4	11 x 100 =	1100	44	86
Core	3	1 x 75 =	75	03	
Core Practical	4	1 x100 =	100	04	
Core Practical	3	1 x 75 =	75	03	
Core Practical	2	1 x 50 =	50	02	
Allied	3	4 x 75 =	300	12	
Allied Practical	4	1 x 100 =	100	04	
Allied Practical	2	1 x 50 =	50	02	
Elective	4	3 x 100 =	300	12	
Part IV					
Skill Based Subjects	1	1 x50 =	50	02	20
Skill Based Practical	3	3 x50 =	150	06	
Value Education	2	2 x 50=	100	04	
Environmental Studies	2	1 x 50 =	50	02	
General Awareness	2	1 x 50 =	50	02	
NMEC	2	2 x 50 =	100	04	
Part V					
Extension Activity	2	1 x 50 =	50	2	02
Total			**3500**	**140**	**140**

FOR COURSE COMPLETION

Students have to complete the following Subjects:

- Language papers (Tamil/Malayalam/French/Hindi, English) in I, II, III and IV SEMESTER-.
- Environmental Studies in I SEMESTER-.
- Value Education in II and III SEMESTER- respectively.
- General Awareness in IV SEMESTER-.
- Allied papers in I, II, III and IV SEMESTER-s.
- Two Non Major Elective Courses in III and IV SEMESTER-.
- Skill Based Courses III,IV,V and VI SEMESTER-
- Extension Activity in VI SEMESTER-
- Elective papers in the Fifth and Sixth SEMESTER-s.
- Dietary Internship in Multi Specialty Hospital for a period of one month at the end of IV and VI SEMESTER- is necessary to complete the course and eligible for the degree

15UTL11U	பகுதி – 1 : தமிழ் தாள் -1	முதல் பருவம்

Total Credit: 4
Hours per week: 6

(இரண்டு ஆண்டுகள் தமிழ் பயிலும் மாணவர்களுக்குரியது)
(கவிதை, சிறுகதை, இதழியல், இலக்கணம், இலக்கிய வரலாறு)

அலகு -1 கவிதைகள்

1. பாரதியார் – செந்தமிழ்நாடு
2. பாரதிதாசன் – புத்தகச் சாலை, நீங்களே சொல்லுங்கள்
3. கவிமணி – ஒற்றுமையே உயிர்நிலை
4. சிற்பி – பெல்ஜியம் கண்ணாடி
5. மு.மேத்தா – மரங்கள்
6. ஆ.வெண்ணிலா – நீரில் அலையும் முகம்

அலகு - 2 சிறுகதைகள்

1. புதுமைப்பித்தன் – கடவுளும் கந்தசாமிப் பிள்ளையும்
2. ஜெயகாந்தன் – யுக சந்தி
3. தி.ஜானகிராமன் - சிலிர்ப்பு
4. நாஞ்சில் நாடன் – சூடிய பூ சூடற்க
5. பட்சி – பெத்த வயிறு

அலகு - 3 நீதி இலக்கியம்

1. திருக்குறள் - அறன் வலியுறுத்தல்
2. ஏலாதி – (பா.எண் : 15,16,26,39,47)
3. கார்நாற்பது – (முதல் 10 பாடல்கள்)

அலகு - 4 இதழியல் கலை

1. இதழியல் விளக்கம் (இதழியல் விளக்கமும் இலக்கணமும், இதழ்களின் பணிகளும் பொறுப்புகளும், இதழ்களின் வகைகள்)
2. தமிழ் இதழ்கள் (நாளிதழ்கள், வார இதழ்கள், மாத இதழ்கள்)
3. தமிழ் ஊடகங்கள் (வானொலி, தொலைக்காட்சி, இணையம்)

அலகு – 5 இலக்கிய வரலாறும் இலக்கணமும்

1. தமிழ்க் கவிதையின் தோற்றமும் வளர்ச்சியும் (மரபுக்கவிதை, புதுக்கவிதை)
2. தமிழ்ச் சிறுகதையின் தோற்றமும் வளர்ச்சியும்
3. பதினெண் கீழ்க்கணக்கு நூல்கள்
4. **இலக்கணம்** : அ)ஒற்றுமிகும் இடங்கள், ஆ) ஒற்று மிகா இடங்கள்

பார்வை நூல்கள்

1 . தமிழ்த்துறை வெளியீடு

2. இலக்கிய வரலாறு – பேராசிரியர் முனைவர் பாக்யமேரி

3. இதழியல் கலை - மா.பா.குருசாமி

15UHL11H	PART-I: HINDI-I	SEMESTER-- I

Total Credit: 4
Hours per week: 6

Prose, Non-detailed Text, Grammar & Translation Books Prescribed:

1. PROSE : **Nuthan Gadya Sangrah**

EDITOR: Jayaprakash (Prescribed Lessons – only 4)

Lesson 1 - Razia
Lesson 2 – Makreal
Lesson3- Bahtha Pani Nirmala
Lesson 4 – Rashtrapitha Mahathma Gandhi

PUBLISHER: Sumitra Prakashan Sumitravas,
16/4 Hastings Road,
Allahabad – 211 001.

2. NON DETAILED TEXT: Kahani Kunj.

EDITOR: Dr.V.P.Amithab. (Stories 1 -4 only)
Publisher : Govind Prakashan Sadhar Bagaar,
Mathura,
Uttar Pradesh – 281 001.

3. GRAMMAR : Shabdha Vichar (Sangya, Sarvanam, Karak, Visheshan) ONLY
(Noun, Pronoun, Adjective, Case Endings)
Theoretical & Applied. Book for

REFERENCE : Vyakaran Pradeep by Ramdev.
Publisher : Hindi Bhavan,
36,Tagore Town
Allahabad – 211 002. 4.

4. **TRANSLATION:** English- Hindi only. Anuvadh Abhyas – III (1-10 lessons Only)

PUBLISHER: Dakshin Bharath Hindi Prachar Sabha
Chennai -17.

5. COMPREHENSION :

Passage from Anuvadh Abhyas – III
(16- 30)
Dakshin bharath hindi prachar sabha,
Chennai- 17.

15UML11M	PART-I: MALAYALAM-I	SEMESTER--I

Total Credit: 4
Hours per week: 6

Paper I Prose, Composition & Translation

This paper will have the following five units:

Unit I &II - Novel
Unit III & IV - Short story
Unit V **-** Composition & Translation

TEXT BOOKS:

Unit I &II - Naalukettu – M.T. Vasudevan Nair (D.C. Books, Kottayam, Kerala)

Unit III & IV - Manikkianum Mattu Prathana Kathakalum – Lalithampika Antharjanam (D.C.Books, Kottayam, Kerala)

Unit V -Expansion of ideas, General Essay and Translation of a simple passage from English about **100** words) to Malayalam.

REFERENCE BOOKS:

1. **Kavitha Sahithya Charitram** –*Dr. M.Leelavathi* (Kerala Sahithya Academy, Trichur)
2. **Malayala Novel Sahithya Charitram** –*K.M.Tharakan*(N.B.S. Kottayam)
3. **Malayala Nataka Sahithya Charitram-** *G.Sankarapillai*(D.C.Books, Kottayam)
4. **Cherukatha Innale Innu** –*M.Achuyuthan*(D.C. Books, Kottayam)
5. **Sahithya Charitram Prasthanangalilude**-*Dr. K.M. George*,(Chief Editor) (D.C. Books, Kottayam)

15UFL11F	PART-I: FRENCH-I	SEMESTER-- I

Total Credit: 4

Hours per week: 6

French Language for Under-graduate Degree Programmes

Compétence Culturelle	Compétence De communication	Compétence grammaticale
UNITÉ 1 – Ici, en France		
• Moi et les Autres • La France Express	• INTERACTION: s'identifier • RÉCEPTION ECRITE: Comprendre une annonce d'aeroport • RÉCEPTION ORALE: comprendre l'ecrit de la rue (Panneaux, plaques, rues...) • PRODUCTION ÉCRITE**:** écrire un SMS	• Le présent des verbes: Je suis, je reste,J'arrive • Le lieu: (je suis) à… (je suis) ici • L'infinitif
UNITÉ 2 – Ici, en classe		
• Moi et le francais • Le francais dane le monde	• INTERACTION: Se présenter • RÉCEPTION ORALE: Comprendre des consignes Orales • RÉCEPTION ÉCRITE: Comprendre une fiche D''inscription • PRODUCTION ÉCRITE: écrire un texte à 'impératif	• Tu/vous • Le present des Verbes en-er et de être:je, tu,vous • La forme Impérative (tu ,vous) Des verbes en-er
UNITÉ 3 - Samedi		
• Le fil du temps	• INTERACTION: S'informer • RÉCEPTION ORALE: Comprendre une annonce • RÉCEPTION ÉCRITE: Comprendre un article (titres et illustrations) • PRODUCTION ÉCRITE: écrire des slogans	• Les articles Défines:le,la,les • A,de+le,la,les: Au,aux,du,des,à l', de l' • Être(présent)I'heure • Ll faut+nom Ll faut+infinitive • Pharses verbe+complément,

		Complément+verbe
UNITÉ 4 - Dimanche		
• Les activités Culturelles des Français	• INTERACTION: Acheter,demander des Informations • RECEPTION ORALE: Comprendre les Titres du journal à la radio • RÉCEPTION ÉCRITE: Comprendre les Informations • PRODUCTION ÉCRITE: Inventer des noms de journaux	• Faire, present • Avior, present • Ll y a • Le présent des verbes en-er: Regarder • Combien? • Quand? • Complément de nom: Tremblement de terre, les noms de pays…. • Du,des,de la(reprise U2) • Les adjectifs possessifs: Mon,ta,son, Ma,ta,sa Mes,tes,ses
UNITÉ 5 – Dommage!		
• Un baby-boom en 2000 et 2001 • L'amour, toujours	• INTERACTION: exprimer la tristesse, la peur, conseiller,encourager • RÉCEPTION ORALE: Comprendre une émission De radio • RÉCEPTION ÉCRITE: Comprendre un sondage • PRODUCTION ÉCRITE: écrire des blogs	• Est-ce que • Le present des verbes pouvoir,Vouloir • Le conditionnel des Verbs pouvoir, Vouloir • Ne…pas

TEXT BOOK:

1. *Marcella Di Giura Jean-Claude Beacco,* **Alors I.** Goyal Publishers Pvt Ltd 86, University Block Jawahar Nagar (Kamla Nagar) New Delhi – 110007.

15UEG12E	PART –II: ENGLISH-I	SEMESTER-- I

Total Credit: 4
Hours per week: 6

OBJECTIVES:

1. To develop the language competence of the students.
2. To be enriched with functional English.

UNIT - I

PROSE

1. My Financial Career – Stephen Leacock
2. At School – Gandhi
3. Ecology – Barry Commoner

UNIT – II

SHORT STORIES

1. The Gateman's Gift – R.K. Narayan
2. The Open Window – H.H. Munro
3. The Face of Judas Iscariot – Bonnie Chamberlain

UNIT – III

ONE ACT PLAY

1. The Discovery – Herman Ould

UNIT – IV

FUNCTIONAL GRAMMAR

1. Vocabulary Exercises
2. Synonyms, Compound Words, etc
3. Communication Skills – Tasks
4. Different types of sentences
5. The Structure of Sentences
6. Transformation of Sentences

UNIT – V

COMPOSITION TASKS

1. Greeting, Introducing, Requesting, Inviting
2. Congratulating, Thanking, Apologising, Advice
3. Suggestions, Opinions, Permissions.
4. Comprehension

TEXT BOOKS:

1. *Seshasayee. N*. 2001. **Honeycomb.** Anu Chitra Publications, Chennai.
2. *Syamala, V*. 2002. **Effective English Communication for You**. Emerald Publisher, Chennai.

REFERENCE BOOKS:

1. *Rajamanickam. A.* 2001**. Everyman's English Grammar.** Macmillan.
2. *Krishna Mohan and Meera Banerji*. 2005. **Developing Communication Skills.** Macmillan, Chennai.
3. *Wren, P.C. and H. Martin***.** 1998**. High School English Grammar and Composition.** Macmillan.

15UFN13A	CORE- I: BASIC FOOD SCIENCE	SEMESTER-- I

Total Credits: 4
Hours/Week: 5

OBJECTIVES:

To enable students

1. Obtain knowledge of different food groups, their composition and role in day's diet.
2. To gain knowledge of various methods of cooking foods.
3. Nutritive value and principles of cooking of foods.

CONTENTS

UNIT –I

Food groups: Basic 4, 5 and7 food groups; functional food groups-energy yielding, body building and protective foods (only sources and not properties and functions), food pyramid.
Study of various cooking methods: Boiling, steaming, stewing, frying, baking, roasting, broiling, cooking under pressure.
Cereals : composition of rice, wheat, effects of cooking on parboiled and raw rice, principles of starch cookery, gelatinization.

UNIT –II

Pulses and legumes : Varieties of pulses, legumes and grams, composition, nutritive value, cooking quality of pulses, germination and its effect
Vegetables: Classification, composition, nutritive value, selection and preparation for cooking, methods and principles involved in cooking.
Fruits -Composition, nutritive value, changes during ripening, methods and effects of cooking, enzymatic browning.

UNIT –III

Beverages - Classification, nutritive value, milk based beverages-methods of preparing tea and coffee, fruit based beverages and preparation of carbonated non – alcoholic beverages.
Spices and Condiments - Uses and abuses
Fats and Oils - Types of oils, function of fats and oils, shortening effects of oil, smoking point of oil, effect of heat on oil absorption and factors

affecting absorption of oil Sugar - Stages of sugar cookery, crystallization and factors affecting crystallization

UNIT –IV

Milk - Composition, nutritive value, kinds of milk, pasteurization and homogenization of milk, changes in milk during heat processing, preparation of cheese and milk powder

Egg - Structure, composition, selection, nutritive value, uses of egg in cookery, methods of cooking, foam formation and factors affecting foam formation

UNIT –V

Meat -Structure, composition, nutritive value, selection of meat, post mortem changes in meat, aging, tenderness, methods of cooking meat and their effects.

Poultry – types, composition, nutritive value, selection, methods of cooking

Fish - Structure, composition, nutritive value, selection of fish, methods of cooking and effects

TEXT BOOKS:

1. *Srilakshmi, B.* (2003). **Food Science.** 3rd Edition. New Delhi: New Age International.
2. *Shakunthala Manay and Shadakhraswamy M.,* (2008). **Food Facts and Principles**, Third Edition, New Age International Publishers, New Delhi.

REFERENCE BOOKS:

1. *Mudambi .R. Sumathi and Rajagopal M.V* (2008), **Food Science.** New Age International Publishers, New Delhi.
2. *Thangam E. Philip* (1998). **Modern Cookery Volume II, Orient Longman, II Edition**., Hyderabad

15UFN13B	CORE- II: FOOD CHEMISTRY	SEMESTER- I

Total Credits: 3
Hours/Week: 3

OBJECTIVES:

To enable students

1. To understand the chemical nature and reactions in foods

CONTENTS

UNIT – I

Definitions – Food chemistry, importance of food chemistry, principle components of foods, properties - Physical, chemical, functional and kinetic properties. **Carbohydrates** – Definition, Classification, Chemical reactions, functional properties of sugar.

UNIT –II

Protein – Structural classification, functional properties -physical, chemical, functional of protein. **Fat** – Structural classification, properties – physical, chemical, functional properties of oils and fats, effects of processing on functional properties of fats and oils.

UNIT – III

Colloidal system in foods – meaning, types, properties, **Sols** – meaning, types, properties, **Gels** – meaning, type, properties, theory of gel formation, factors influencing gel formation. **Emulsion** – meaning, types, properties, emulsifying agents - natural and synthetic emulsifier, functions of emulsifying agent, common food emulsions. **Foams** – meaning, properties, methods of foam formation, theory of foam formation, foaming agents – natural and synthetic.

UNIT – IV

Water – classification, forms of water, hydrogen bonding in water, water and ice properties, functions of water in food, Intermediate Moisture Foods, water activity – definition, measurement and control of water activity, estimation of moisture in foods.

UNIT – V

Enzymes – definition, chemical classification, properties of enzymes, importance of enzymes, enzymes involved in food reactions – beneficial and deterioration and its prevention, **Pigments** – classification, properties and food sources

TEXT BOOKS:

1. *Srilakshmi, B.* (2003). **Food Science,** III Edition, New Delhi: New Age International.
2. *Shakunthalamanay and Shadakhraswamy*, (2008), **Food Facts and Principles,** Third Edition, New Age International Publishers, New Delhi.

REFERENCE BOOKS:

1. *Mudambi .R. Sumathi and Rajagopal M.V* (2008), **"Food Science",** New Age International Publishers, New Delhi.
2. *Sunetra Roday* (2000), **Food Science and Nutrition,** Edition I, Mangal Deep Publications, New Delhi.

15UFN13P	CORE PRACTICAL - I: - FOOD SCIENCE	SEMESTER- I

Total Credits: 2
Hours/week: 3

OBJECTIVES:

To enable students

1. Understand different food groups, their composition and role in day's diet.
2. Use various methods of cooking foods
3. Prepare some food items.
4. Relate nutritive value and food selection.

Experiments:

1. Food group- Grouping of foods, discussion on nutritive value
2. Measuring ingredients -
3. Methods of measuring different types of foods – grains, floursand liquids
4. Edible portion Determination of edible portion percentage
5. Cooking methods
6. Moist heat methods – boiling, simmering, steaming, and pressure cooking
7. Dry heat methods – baking, Fat as a medium for cooking-shallow and deep fat frying
8. Cereals - Methods of cooking fine and coarse cereals. Examination of starch
9. Pulses - Cooking of soaked and unsoaked pulses. Common preparation with pulses
10. Vegetables Experimental cookery using vegetables of different colors and textures
11. Preparation of soups and salads, Common preparation with vegetables
12. Fruits - Prevention of darkening in fruits and vegetables. Fruit salad
13. Milk and milk products

14. Experimental cookery – cream of tomato soup, cheese curry and cooking vegetables in milk, Common preparation with milk, cheese and curd
15. Fleshy foods Fish, meat and poultry- preparations
16. Egg Experimental cookery- boiled egg, poached egg. Common preparations with egg
17. Beverages Preparation of hot beverages- coffee, tea, Preparation of cold beverages-fruit drinks and milk shake
18. Evaluation Development of score card
19. Developing value added foods (cereal, millet, pulse and vegetable based) any four

15UCY1AA	ALLIED PAPER – CHEMISTRY I	SEMESTER I

Total Credits: 3
Hours/ Week:3

OBJECTIVE:

1. On successful completion of this course the students shall gain knowledge in the basics of chemistry which helps bioscience students to understand chemical bonding in the biomolecules and the techniques involved in the biochemistry.

CONTENTS

UNIT – I

Chemical bonding:

1. Molecular Orbital Theory, bonding, antibonding, and nonbonding orbitals. MO configuration of H_2, N_2, O_2, F_2- bond order – diamagnetism and paramagnetism.
2. Ionic Bond: Nature of ionic bond, structure of NaCl and CsCl, factors influencing the formation of ionic bond.
3. Covalent Bond: Nature of covalent bond, structure of CH_4, NH_3, H_2O, shapes of $BeCl_2$, BF_3, based on VSEPR theory and hybridization.

UNIT – II

Solutions:

1. Normality, molarity, molality, molefraction, moleconcept.
2. Primary and secondary standards – preparation of standard solutions.
3. Principle of Volumetric analysis (with simple problems).
4. Strong and weak acids and bases - Ionic product of water- pH, pKa, pKb, Buffer solution and pH and pOH simple calculations.

UNIT–III

Basic Organic Chemistry:

1. Electron displacement effect in organic compounds - Inductive effect – Electromeric effect - Resonance effect, Hyperconjugation, Steric effect, acidity of organic acids and bases.
2. Isomerism, Symmetry of elements (Plane, Centre and Axis of symmetry), Molecules with one chiral carbon and two adjacent chiral carbons –Optical isomerism of tartaric acid, Enantiomers – Diastereomers – Separation of racemic mixture - Geometrical isomerism (maleic &fumaric acid).

UNIT – IV

1. **Surface Chemistry:**
   Adsorption – Chemisorption - Physisorption.Difference between chemisorption and physisorption - Applications of adsorption - Factors influencing adsorption.Isobar, Isostere.

2. Chromatography - Principle & applications of Column, Paper and Thin Layer Chromatography.

UNIT – V

Dyes:

1. Terms used – Chromophore,Auxochrome, Bathochromic shift, Hypsochromic shift,Hyperchromic shift, Hypochromic shift. Classification of dyes based on chemical structure & application- Preparation of azo(Methyl orange) and triphenyl methane (Malachite green) dyes.

TEXT BOOKS:

1. *R. D. Madan. 2001.***Modern Inorganic Chemistry**. S. Chand & Company, New Delhi,.
2. *Puri , Sharma, Pathania. 2004.***Principles of Physical Chemistry**, Vishal Publishing Company, Jalandhar.
3. *M. K. Jain, S. C. Sharma. 2001*. **Organic Chemistry**, ShobanLalNayin Chand, Jalandhar.
4. *Gopalan R. 1991.***Elements of Analytical Chemistry**, Sultan Chand & Sons, New Delhi.

15UTL21U	பகுதி – 1: தமிழ் தாள் - 2	இரண்டாம் பருவம்

Total Credit: 4
Hours per week: 6

(இரண்டு ஆண்டுகள் தமிழ் பயிலும் மாணவர்களுக்கு உரியது)

சமய இலக்கியங்கள்

அலகு -1 சைவ வைணவ இலக்கியங்கள்

1. திருஞானசம்பந்தர் – தோடுடைய செவியன் (11 பாடல்கள்)
2. குலசேகர ஆழ்வார் – திருவேங்கட மலைத்தொடர்பு வேண்டல்

அலகு -2 கிறித்துவ இசுலாமிய இலக்கியங்கள்

1. கண்ணதாசன் – இயேசு காவியம் – மலைப்பொழிவு
2. உமறுப்புலவர் - சீறாப்புராணம் – மானுக்குப் பிணை நின்ற படலம்

அலகு -3 சமயச் சான்றோர் வரலாறு

1. சைவ சமயச் சான்றோர்

   திருநாவுக்கரசர், மாணிக்கவாசகர்
2. வைணவ சமயச் சான்றோர்

   பெரியாழ்வார் , ஆண்டாள்
3. கிறித்துவ சமயச் சான்றோர்

   கால்டுவெல், ஜி.யூ.போப்
4. இசுலாமிய சமயச் சான்றோர்

   குணங்குடி மஸ்தான் , சவ்வாதுப் புலவர்

அலகு – 4 சமய இலக்கிய வரலாறு

1. சைவம் 2. வைணவம்

அலகு - 5 இலக்கணம்

1. பெயர்ச்சொல், 2. வினைச்சொல், 3. இடைச்சொல், 4. உரிச்சொல் – பொது இலக்கணம்

பார்வை நூல்கள்

1 . தமிழ்த்துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு – பேராசிரியர் முனைவர் பாக்யமேரி

15UHL21H	PART-I: HINDI-II	SEMESTER- II

Total Credit: 4
Hours per week: 6

(Modern Poetry, Novel, Translation & Letter Writing)

1. Modern Poetry: Shabari – By Naresh Mehtha

Publishers: Lokbharathi Prakashan I Floor,Duebari Building
Mahathma Gandhi Marg,
Allahabad -1.

2. Novel: Seva Sadhan – By Prem Chand

Publisher:

3.Translation: Hindi – English Only,
(anuvadh abyas – iii) lessons.1 – 10 only publisher:
dakshin bharath hindi prachar sabha chennai – 600 017.

4. Letter Writing: (Leave letter, Job Application, Ordering books, Letter to Publisher, Personal letter).

15UML21M	PART-I: MALAYALAM-II	SEMESTER- II

Total Credit: 4
Hours per week: 6

PAPER II PROSE: NON-FICTION
This Paper will have the following five units:

UNIT I & II

Biography

UNIT III, IV & V

Travelogue

TEXT BOOKS PRESCRIBED:

Unit I & II - *Changampuzha Krishna Pillai:* **Nakshatrangalude Snehabhajanam** – *M.K. Sanu* (D.C. Books, Kottayam)

Unit III, IV & V - **Kappirikalude Nattil –** *S.K. Pottakkadu* (D.C. Books, Kottayam).

REFERENCE BOOKS:

1. **Jeevacharitrasahithyam –***Dr. K.M. George*(N.B.S. Kottayam)
2. **Jeevacharitrasahithyam Malayalathil -** *Dr.NaduvattomGopalakrishnan* (Kerala Bhasha Institute, Trivandrum)
3. **Athmakathasahithyam Malayalathil –***Dr. Vijayalam Jayakumar*(N.B.S. Kottayam)
4. **Sancharasahithyam Malayalathil -** *Prof.Ramesh Chandran*. V, (Kerala Bhasha Institute, Trivandrum)

15UFL21F	PART-I: FRENCH-II	SEMESTER- II

Total Credit: 4
Hours per week: 6

French Language for Under-graduate Degree Programmes

Compétence Culturelle	Compétence De communication	Compétence grammaticale
UNITÉ 6 – Super!		
• L'égalité homme/femme	• INTERACTION: Exprimer des sentiments, exprimer la joie, le plaisir, le bonheur • RÉCEPTION ORALE: Comprendre un jeu radiophonique • RÉCEPTION ÉCRITE: Comprendre des announces • PRODUCTION ÉCRITE: Écrire des cartes postales	• Les noms de professions masculine/feminine • Le verb finir et less Verbes du groupe en-ir • Le present de l'impératif • Savoir(present) • Le participle passé: Fini, aimé, arrive, dit,écrit • Quel(s), quelle(s)..: Interrogatif et Exclamatif • À + infinitive • Les articles: n,une,des
UNITÉ 7 – Quoi?		
• Le 20 siécle: Petits progrés Grand progrés	• INTERACTION: Decrire quelque chose, une personne • RECEPTION ORALE: Comprendre un message publicitaire • RÉCEPTION ÉCRITE: Comprendre un dépliant touristique • PRODUCTION ÉCRITE: Écrire des petites annonces	• On • Plus, moins • Le verbe aller: • Present, impératif • Aller + infinitife • Le pluriel en –x
UNITÉ 8 – Et aprés		
• Nouvelles du jour	• INTERACTION: Raconteur,situer un récit dans le temps • RÉCEPTION ORALE: Comprendre une	• L'imparfait:: quel-Ques forms pour introduire le récit:Il faisait, il y avait, il Était

	description • RÉCEPTION ÉCRITE: Comprendre un test • PRODUCTION ÉCRITE: écrire des cartes postales	• Un peu, beaucoup, trop,Assez • Trés • Le verbe venir: Présent, impératif • En Suisse, au Maroc, aux Etats-Unis
UNITÉ 9 – Mais oui!		
• La génération des 20-30 ans	• INTERACTION: Donner son opinion, Expliquer pourquoi • RÉCEPTION ORALE: Comprendre des informations à la radio • RÉCEPTION ÉCRITE: Comprendre un texte informatif • PRODUCTION ÉCRITE: éncrire un mél de protestation	• Répondre, prendre: Présent, impératif, part Passé • Parce que pourquoi • Tout/tous, toute/s Tous/toutes les… (répétition action)
UNITÉ 10 – Mais non!		
• De la ville à la campagne	• INTERACTION: Débat:: exprimer l'accord, exprimer le Désaccord • RECEPTION ORALE: Comprendre un message sur un répondeur téléphonique • RÉCEPTION ÉCRITE: Comprendre un témoignage • PRODUCTION ECRITE: Rediger des petites Announces immobilieres	• Le verbe devoir: Present et participe passé • Le verbe vivre, present • Aller + infinitive • Venir+ infinitive • Etre pour/contre

TEXT BOOK:

1. *Marcella Di Giura Jean-Claude Beacco,* **Alors I.** Goyal Publishers Pvt Ltd 86, University Block Jawahar Nagar (Kamla Nagar) New Delhi – 110007.

15UEG22E	PART-II: ENGLISH-II	SEMESTER- II

Total Credit: 4
Hours per week: 6

OBJECTIVES:

1. To develop the language competence of the students.
2. To be enriched with functional English.

UNIT - I

PROSE

1. Words of Wisdom – Chetan Bhagat
2. Forgetting – Robert Lynd
3. My Early Days – Dr. Abdul Kalam

UNIT - II

SHORT STORIES

1. Am I Blue? – Alice Walker
2. Last Leaf – O Henry
3. Selfish Giant – Oscar Wilde

UNIT - III

ONE ACT PLAY

1. Soul Gone Home - Langston Hughes

UNIT - IV

FUNCTIONAL GRAMMAR

1. Lexical Skills and Question Forms
2. Idioms and Phrases – Subject-Verb Agreement
3. Spelling, Antonyms and Synonyms, Infinitives
4. Vocabulary, Report Writing
5. Plurals, Particles in Adjectives
6. Apostrophe, Archaic Words, Art of Persuasion
7. Syllables, Changing Adjectives to Nouns
8. Homonyms, Prepositions
9. Compound Words, Acronyms, Collective Nouns, Degrees of Comparison

UNIT - V

COMPOSITION TASKS

1. Letter Writing - Structure
2. Business Correspondence – Memos, reports, proposals
3. Resume & C.V.
4. Advertisements
5. Notices, Agenda, Minutes
6. Circulars
7. Essay Writing
8. Précis Writing
9. Dialogue Writing
10. Soft Skills, Business English

TEXT BOOKS:

1. *Board of Editors.* 2012. **Radiance – English for Communication**, Emerald Publishers.
2. *Syamala, V*. 2002. **Effective English Communication for You**. Emerald Publisher, Chennai.

REFERENCE BOOKS:

1. *Rajamanickam. A.* 2001**. Everyman's English Grammar.** Macmillan.
2. *Krishna Mohan and Meera Banerji*. 2005. **Developing Communication Skills.** Macmillan, New Delhi.
3. *Wren, P.C. and H. Martin***.** 1998**. High School English Grammar and Composition.** Macmillan

15UFN23A	CORE-III: HUMAN PHYSIOLOGY	SEMESTER - II

Total Credits: 4

Hours/Week: 5

OBJECTIVES:

To enable students

1. Understand the structure and functions of various organs of the body.

Obtain a better understanding of the principles of nutrition through the study of physiology.

CONTENTS

UNIT-I

Cell - Structure and functions, Tissues - Structure and functions
Digestive system - Anatomical consideration – structure and functions, Brief study of the organization of the digestion, absorption and assimilation of food

UNIT-II

Blood, RBC, WBC, Platelets and Lymph, Blood coagulation, blood grouping and Rh factor, **Circulatory system** - Heart structure and functions - cardiac cycle, ECG.

UNIT-III

Respiratory system - Basic anatomy of the respiratory system, process of respiration, transport and exchange of oxygen and carbon dioxide in the body
Endocrine glands - Structure and function of pituitary, thyroid, islets of langerhans and adrenal gland

UNIT-IV

Reproductive system - Anatomy of the male and female reproductive organs, menstrual cycle
Sense organs - Structure and function of eye, ear and skin

UNIT-V

Excretory system - Excretory organs - structure of kidney and functions, formation of urine, composition of urine.
Muscles - physiology of muscular action.
Central nervous system - Physiology of the nerve cell, parts of the central nervous system and function.

ACTIVITY:

1. Identification of tissues
2. Bleeding time and Clotting time
3. Blood groups – identification
4. Measuring Pulse Rate
5. Demonstration of measurement of Hemoglobin
6. Demonstration of Measuring Blood Pressure
7. Demonstration of RBC, WBC

TEXT BOOKS:

1. *Chatterjee C.C. (1987)*: **Human Physiology,** Vol. I and II, Medical Allied Agency, Calcutta.
2. *Wilson, K.J.W and Waugh, A. (1996):* **Ross and Wilson, Anatomy and Physiology in Health and Illness,** 8th Edition, Churchill Livingstone.

REFERENCE BOOKS:

1. *Sembulingam K. and Prema Sembulingam,* (2013), Essentials of Medical Physiology, Edition VI, Jaypee Brothers Medical Publishers (P) LTD, New Delhi
2. *Meyer B J, Meij H S and Meyer A C., (1997):* **Human Physiology,** AITBS Publishers and Distributors.

15UFN23B	CORE- IV: PRINCIPLES OF NUTRITION	SEMESTER- II

Total Credits: 4
Hours/Week: 6

OBJECTIVES:

1. To Understand the vital link between nutrition and health
2. To Gain knowledge on functions, metabolism and effects of deficiency of nutrients.

CONTENT

UNIT-I

Introduction to Nutrition - General introduction, history of Nutrition
Energy - Definition of Kilocalories, Joule, energy value of foods, determination, and physiological fuel values, SDA of foods, **Basal metabolic rate-** definition, factors influencing BMR. Recommended Dietary Allowances for energy **Carbohydrates -** Classification, functions, source, digestion, absorption and utilization, Dietary fiber and health

UNIT-II

Protein - Classification, functions, sources and requirements, digestion, absorption and utilization, Protein quality – PER, BV, NPU, digestibility coefficient, -definition and calculation Reference protein, essential amino acids and mutual supplementation of dietary protein **Fats and Lipids** - Classification, functions, sources, requirement, importance of essential fatty acids, their requirements and deficiency

UNIT-III

Vitamins – Fat soluble vitamins –A, D, E and K- functions, source, requirements, deficiency disorders Water soluble vitamins –The B-complex vitamins – Thiamine, Riboflavin, Niacin, Folic acid, Biotin, Pantothenic acid and Vitamin C - functions, source, requirements and deficiency disorders.

UNIT-IV

Minerals - General functions in the body, classification- macro and micro minerals. Micro minerals – Iron, Fluorine, Zinc, copper, Iodine -functions, absorption, utilization, requirements, deficiency and toxicity Macro

minerals – Calcium and phosphorus - functions, absorption and utilization of iron requirements, deficiency and toxicity

UNIT-V

Water Balance – Functions of water, water distribution, maintenance of water and regulation of acid-base balance in the body. Electrolyte balance

TEXT BOOKS:

1. *Srilakshmi B, (*2014*),* **Nutrition Science,** Fourth Edition, New Age International Publishers, New Delhi.
2. *Shubhangini A. Joshi, (*1992*)'* **"Nutrition and Dietetics",** Tata Mc Grow Hill publishing Company Ltd, New Delhi.

REFERENCE BOOKS:

1. *Swaminathan M, (*1996*),* **Hand Book of Food and Nutrition,** Bangalore Printing Publishing Company, Bangalore
2. *Vijay Kaushik, (*2000*),* **Food Science and Nutrition,** Mangal Deep Publications, New Delhi.

15UCY2AA	ALLIED PAPER – CHEMISTRY II	SEMESTER II

Total Credits: 3
Hours/ Week: 3

OBJECTIVE:

1. On successful completion of this course the students shall gain knowledge in the basics of chemistry which helps bioscience students to understand the periodic table, IUPAC nomenclature of organic compounds, enzyme kinetics and water technology.

CONTENTS

UNIT I

Periodic Table:

1. Long form of periodic table – Classification of elements on the basis of electronic configuration – Periodicity in properties – Causes of periodicity – atomic and ionic radii – electron affinity – ionization energy – electronegativity – Pauling and mullikan scale – Allred and Rochow's scale – factors affecting the magnitude of electronegativity – application of electronegativity.

UNIT II

1. **Carbohydrates:** Classification, preparation, properties & structure of glucose, fructose, inter conversion of glucose to fructose and fructose to glucose, mutarotation.

2. **Vitamins:** Sources of vitamins, Disease caused by the deficiency of vitamins.

UNIT III

1. IUPAC Nomenclature of organic compounds – alkanes, alkenes, alcohols, ethers, aldehydes, ketones, carboxylic acids(dicarboxylic), benzene and naphthalene derivatives.

2. Heterocyclic Compounds – Preparation and properties of Furan, pyrrole, pyridine &thiophene.

UNIT IV

Kinetics:

1. Rate, rate law, order and molecularity, derivation of rate expressions for I and II order kinetics.

2. Catalysis – homogenous, heterogeneous catalysis, enzyme catalysis (Definition alone), enzymes used in industry.

UNIT V

Water Technology:

1. Hard water – types, disadvantages, determination by EDTA titration.

2. Softening methods – Zeoite – demineralization – reverse osmosis – purification of drinking water, BOD,COD.

TEXT BOOKS:

1. *R. D. Madan. 2001.***Modern Inorganic Chemistry**. S. Chand & Company, New Delhi,.
2. *Puri , Sharma, Pathania. 2004.***Principles of Physical Chemistry**, Vishal Publishing Company, Jalandhar.
3. *M. K. Jain, S. C. Sharma. 2001*. **Organic Chemistry**, ShobanLalNayin Chand, Jalandhar.
4. *Gopalan R. 1991.***Elements of Analytical Chemistry**, Sultan Chand & Sons, New Delhi.

15UCY2AP	ALLIED PRACTICAL –I: CHEMISTRY-I	SEMESTER- II

Total Credits: 4
Hours/Week:4

OBJECTIVES:

1. To kindle interest in students in learning bio-organic chemistry through the introduction of organic compounds

1. VOLUMETRIC ANALYSIS:

1. Estimation of sodium Hydroxide using standard sodium carbonate.
2. Estimation of Hydrochloric acid using standard oxalic acid.
3. Estimation of oxalic acid using standard sulphuric acid.
4. Estimation of Ferrous sulphate using standard Mohr salt solution.
5. Estimation of oxalic acid using standard ferrous sulphate.
6. Estimation of Ferrous ions using Mohr salt solution.

II. ORGANIC ANALYSIS:

1. To Distinguish between aliphatic and aromatic
2. To distinguish between saturated and unsaturated
3. Detection of Elements (N, S, Halogens)
4. Functional group tests for phenols, acids (mono and di), aromatic primary amine, Monoamide, diamide, Carbohydrate Functional group characterized by confirmatory test.

REFERENCE BOOK:

1. *Venkateswaran. V. (*2004), **Basic Principles of Practical Chemistry** [First Edition] Sultan Chand and Sons, New Delhi.

15UTL31U	பகுதி -1 : தமிழ் தாள் -3	மூன்றாம் பருவம்

Total Credits: 4
Hours/week: 5

காப்பியம் – சிற்றிலக்கியம் – நாடகத்தமிழ்

அலகு -1 காப்பியங்கள்

1. சிலப்பதிகாரம் – மங்கல வாழ்த்துப் பாடல்
2. மணிமேகலை – மலர்வனம் புக்க காதை
3. சீவக சிந்தாமணி – பதுமையார் இலம்பகம் (முதல் 20 பாடல்கள்)

அலகு – 2 சிற்றிலக்கியங்கள்

1. கலிங்கத்துப்பரணி – களம் பாடியது
2. மீனாட்சியம்மை பிள்ளைத்தமிழ் – வருகைப் பருவம்

அலகு – 3 நாடகத்தமிழ்

1. சேர தாண்டவம் – பாரதிதாசன்

அலகு - 4 காப்பியம், சிற்றிலக்கியம் – வரலாறு

1. காப்பியங்களின் தோற்றமும் வளர்ச்சியும்
2. சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும்
3. நாடகத்தின் தோற்றமும் வளர்ச்சியும்

அலகு- 5 இலக்கணம்

1. எழுத்து ,அசை, சீர், தளை, அடி, தொடை – விளக்கம்
2. அணி – உவமையணி, தற்குறிப்பேற்றஅணி
3. அலுவலகம் சார்ந்த கடிதம் – விண்ணப்பங்கள் , வேண்டுகோள் ,முறையீடு

பார்வை நூல்கள்

1 . தமிழ்த்துறை வெளியீடு
2. இலக்கிய வரலாறு – பேராசிரியர் முனைவர் பாக்யமேரி
3. இதழியல் கலை - மா.பா.குருசாமி

15UHL31H	PART-I: HINDI-III	SEMESTER -III

Total Credits: 4
Hours/week: 5

(Poetry, History of Hindi Literature, Alankar)

1. **Poetry**: Kavya Prasar – By Dr.Balanath Puplisher: Jawahar Pusthakalay Sadar Bazaar, Mathura – U.P. 281 001. (Pracheen – Kabir, Tulsi, Sur & Meera, Aadhunic – Gupt, Prasad, Panth, Nirala, Dinakar, Agneya

Short Notes On Poets -Only the above mentioned.

2. **History Of Hindi Literature**:
(Only Aadi Kaal and Bhakthi Kaal. Only a general knowledge.) ALANKAR: Anupras, Yamak, Slesh, Vakrokthi, Upama, Rupak,

REFERENCE BOOKS:

Hindi Sahithya Ka Saral Ithihass By Rajnath Sharma, Vinod Pustak Mandir, Agra – 282 002. Kavya Pradeep Rambadri Shukla, Hindi Bhavan, 36, Tagore Town, Allahabad – 211 002.

3. **Alankar:** Anupras, Yamak, Slesh, Vakrokthi, Upama, Rupak,

15UML31M	PART-I: MALAYALAM-III	SEMESTER III

Total Credits: 4
Hours/week:5

PAPER III- POETRY

This Paper will have the following five units:

Unit I, II & III
A part of Ezuthachan's Work

Unit IV & V
A Khandakavya of Vallathol

Text Books prescribed:

Unit I, II & III
Karnnaparvam – Ezuthachan
(Poorna Publications, Calicut)

Unit IV & V

Achanum Makalum – Vallathol (D.C. Books, Kottayam)

15UFL31F	PART-I: FRENCH-III	SEMESTER -III

Total Credits: 4
Hours/week: 5

French Language for Under-graduate Degree Programmes

Compétence Culturelle	Compétence de Communication	Compétence Grammatical
UNITÉ 1- Excuses et vœux		
• Convivialité (lieux et société, l'apéritif)	• INTERACTION ORALE: Accueillir quelqu'un, s'excuser,remercier • RÉCEPTION ORALE: Comprendre des announces enregistrées • RÉCEPTION ÉCRITE: Compremdre une affiche • PRODUCTION ÉCRITE:Écrire des cartes de vœux	• Pronoms personnels toniques *moi,je…;toi…tu* • Pronoms personnels objets *Me,te,le…* • Lesverbsen-ercomme appeler,acheter • Lesadjectives possessives *nos,vos,leurs*
UNITÉ 2 – Bravo et merci		
• Communication et technologies (leportable, internet)	• INTERACTION ORALE: Interagir au téléphone , féliciter • RÉCEPTION ORALE: Comperendre une emission à la radio • RÉCEPTION ORALE: Comprendre une définition • PRODUCTION ECRITE: Écrire des plaques commemoratives	• Oui,que • Le passé composé • Le participe passé *J'ai eu,ella a été* • Longtemps,pendant …, de… à
UNITÉ 3 – Faire et dire		
• Jeunes : enquête	• INTERACTION ORACE: Demander de l'aide, donner des instructions • RÉCEPTION ORALE: Comprendre un message enregistré • RÉCEPTION ÉCRITE : Comprendre un article d'un magazine de consommateurs • PRODUCTION ÉCRITE :	• Ce/*cet,cette,ces* • Le verbe voir • Envoyer,appuyer • Les articles partitifs *du,de la (de l)',des,de*

	Écrire un règlement	
UNITÉ 4 – Faire ci ou faire ça		
• Les vacances des Français	• INTERACTION ORALE : Proposer quelque chose,accepter,refuser • RÉCEPTION ORALE : Comprendre une émission de cuisine • RECEPTION ÉCRITE : Comprendre une brochure d'informations • PRODUCTION ÉCRITE : Ecrire un'texte de promotion touristique	• *S'il y a du soleil* : L'hypothèse (supposition, Condition) la préposition *S i + indicatif* • *Sinon… ou + indicatif* • *Sortir,partir* • *Quelques, plusieurs* • *Le long de* • *Au milieu de…* • *Au sommet de…*
UNITÉ 5 – Cœur et santé		
• Author du Couple	• INTERACTION ORALE: Exprimer son intérêt pour quelqu'un, exprimer l'affection • RECEPTION ORALE: Comprendre une chanson • RECEPTION ÉCRITE: Lire un horoscope • PRODUCTION ÉCRITE: Écrire une letter au courrier du cœur	• J'étais…L'imparfait(1) • Aussi brilliant que… • Le plus beau, le moins cher • Le verbe connaître

TEXT BOOK:

1. *Marcella Di Giura Jean-Claude Beacco,* **Alors II .** Goyal Publishers Pvt Ltd 86, University Block ,Jawahar Nagar (Kamla Nagar), New Delhi – 110007.

15UEG32E	PART-II: ENGLISH-III	SEMESTER- III

Total Credits: 4
Hours/week: 5

OBJECTIVES:

1. To develop the language competence of the students.
2. To be enriched with functional English.

UNIT –I

PROSE

1. On Habits – A. G. Gardiner
2. Men and Women – Virginia Woolf
3. Sweets for Angels – R. K. Narayan

UNIT –II

SHORT STORIES

1. The Ant and the Grasshopper – Somerset Maugham
2. A Day's Wait – Ernest Hemingway
3. The Doll's House – Catherine Mansfield

UNIT III

ONE ACT PLAY

1. The Bishop's Candlesticks- Norman McKinnel
2. A Kind of Justice- Margaret Wood

UNIT -IV

FUNCTIONAL GRAMMAR

1. The Noun
2. The Adjective
3. The Adverb
4. Sentence Structure
5. Sentence Pattern

UNIT -V

COMPOSITION TASKS

1. Human relationships in academic and professional life
2. Deciding on a career
3. Finding a Job
4. Going for an Interview
5. Writing Projects
6. Account of a task completed
7. Recommendation for promotion
8. Writing recording of achievement
10. Story Writing

TEXT BOOKS:

1. *Daniel, James. P.C.* **Focus: A Course in Language and Communication Skills**, Harrows Publications, Bangalore, 560068.
2. *Daniel, James.P.C.* 1989. **English for Career Development, a Course in Functional** English, Orient Longman Private Limited Publications.

REFERENCE BOOKS:

1. *Rajamanickam. A.* 2001**. Everyman's English Grammar.** Macmillan.
2. *Krishna Mohan and Meera Banerji*. 2005. **Developing Communication Skills.** Macmillan, New Delhi.
3. *Wren, P.C. and H. Martin***.** 1998**. High School English Grammar and Composition.** Macmillan.

15UFN33A	CORE –V: NUTRITION IN HEALTH	SEMESTER- III

Total Credits: 4

Hours/Week: 5

OBJECTIVES:

To enable the students

1. Understand the nutritional demands in various stages of life cycle.
2. Acquire skills in planning adequate meals in different stages of life cycle.

CONTENTS

UNIT- I

Basic Principles of Meal Planning – Basic Principles and factors to be considered while planning menu for different age groups, **Recommended Dietary Allowance** - RDA for Indians, basis for requirement, energy allowance for different growth pattern of children, energy allowance for various activities.

UNIT- II

Nutritional needs during Pregnancy – Stages of pregnancy, Normal growth and weight change, complications, Nutritional requirements and meal planning **Nutrition during Lactation** - physiology of lactation, hormonal control and relaxation, nutritional components of colostrum and mature milk, Nutritional requirements of lactating women, Meal planning

UNIT- III

Nutrition during Infancy - Growth and development, factors influencing growth, difference between breast feeding and bottle feeding, factors to be considered in bottle feeding. Different types of milk formulae.

Weaning Foods – Preparation of Weaning foods and commercially and other organization. Uses of growth chart to monitor growth and development, Nutritional requirements of infants' up to one year, Problems of feeding in normal and premature infants.

UNIT- IV

Nutritional needs of toddlers (1-5 year) and School children – Nutritional requirements of toddlers and school going children, Factors to be considered while planning meals for pre-school children. Eating problems of children and their management, packed lunch

UNIT- V

Nutrition during Adolescence - Physical Growth - changes, Nutritional requirement, Nutritional problems in adolescence- Iron deficiency anemia, obesity, anorexia nervosa and bulimia nervosa.
Nutritional needs of adults (men and women) – In relation to occupation, Nutrition in Menopausal women, hormonal changes, Low cost balanced food
Nutrition during Old Age - Physiological changes in ageing- psycho-social and economic factors affecting eating behavior, Nutritional problems of aged and their management

TEXT BOOKS:

1. *Srilakshmi B.,* (2014),**Dietetics,** Edition VII, New Age International Pvt. Ltd, New Delhi
2. **ICMR- Nutritive value of Indian Foods, 2014.**

REFERENCE BOOKS:

1. Shills, E.M. Olson, A.J. and Shike, Lea and Febiger, (1994), ***Modern Nutrition in Health and Diseases****,*
2. *Bonnie S. Worthinton, Roberts, Sue Rod well Williams, (*1996), **Nutrition throughout the life cycle,** The McGraw- Hill company,

15UFN33P	CORE PRACTICAL –II: NUTRITION IN HEALTH	SEMESTER- III

Total Credits: 3
Hours/Week: 3

OBJECTIVES:

To enable the students

1. Prepare and serve the planned menu.
2. Determine the nutrient content of the menu per meal and per portion.

CONTENTS

1. Food groups
2. Planning a menu for a pregnant mother and display a prepared items
3. Planning a menu for a lactating mother and display prepared items and calculate nutritive value for the prepared menu.
4. Preparation of low cost supplementary and weaning foods
5. Planning and preparing diet for infants
6. Planning and preparing diet for preschool children
7. Planning and preparing diet for school going children and
8. Planning and preparing diet for adolescent girls and boys
9. Planning and preparing diet for low, medium, high income groups and based on sedentary, moderate and heavy workers – Adult (Men and Women).
10. Planning and preparing diet for old age.

15UBC3AA	ALLIED- III: BIOCHEMISTRY	SEMESTER- III

Total Credits: 3
Hours/Week: 3

OBJECTIVES:

1. On successful completion of the course the students should have understood the significance of the complex bio-molecules, polysaccharides, lipids, proteins, nucleic acids, vitamins and minerals.

CONTENTS

UNIT-I

Carbohydrates: Monosaccharides -Definition, classification, structure and properties. Disaccharides - Definition, types, structure and biological importance. Polysaccharides - types and properties.

UNIT-II

Lipids - Definition, Classification and properties of lipids. Types of fatty acids - saturated, unsaturated and essential fatty acids, Classification and significance of lipoproteins and phospholipids, Importance of steroids, Structure and biological significance of cholesterol

UNIT-III

Amino acids: Classification of amino acids, essential amino acids, reactions of amino and carboxyl groups of amino acids. Proteins: Definition, classification and function of Proteins, structural levels of organization (Preliminary treatment). Denaturation and isoelectric point of Proteins

UNIT-IV

Nucleic acids: Components of DNA and RNA. Double helical structure of DNA, Structure and types of RNA, Denaturation and renaturation of DNA, Genetic code, Protein synthesis (an outline)

UNIT-V

Enzymes: Classification of enzymes with examples, coenzymes and cofactors (structures not needed). Active site: Lock and Key model, induced fit hypothesis, Factors affecting enzyme activity. Types of inhibition of enzyme action, Chemical and industrial applications of enzymes,

TEXT BOOK:

1. *Deb A.C.,* (2008), **Fundamentals of Biochemistry,** 6th Edition –New Central Book Agency, Calcutta

REFERENCE BOOKS:

1. *Lehninger, David L. Nelson and Michael M. Cox,* (1975), **Biochemistry**, Edition II, Cox-CBS Publishers
2. *Murray R.K., Granner D.K, Mayes P.A. and Rodwell U. W.* (2005), **Harper's Biochemistry**:– Lange Medical publications, 26th Edition

15UFN3SA	SKILL BASED SUBJECT- I: BASIC COMUTER SCIENCE IN NUTRITION	SEMESTER- III

Total Credits: 2
Hours/Week: 4

OBJECTIVES:

To enable students

1. Gain knowledge on computer operations and applications
2. To design and use computer based projects and programs.
3. To use existing health and nutrition based software.

CONTENTS

UNIT – I

Introduction to the world of computers

Basic concepts on computer - history, types of computers, input and output devices, peripheral devices, meaning of software and hardware
Ms Windows – Introduction, basic concepts on a windows, windows explorer, control panel, configuration, editor, Accessories – Paint brush

UNIT –II

Ms Word – concepts of document and template, creating documents and saving, concepts of editing, formatting, working with tables and tabs, tools, spell check, grammar check, file printing, mail merge, word art.

UNIT – III

Ms Excel – Concepts of spread sheet, creating, work sheet, work space, formatting a work sheet, basic operations on data, sorting, total and subtotal, creating link between documents, programming in macros, working with charts, printing worksheets.
Ms PowerPoint – concepts of PowerPoint, creating, opening, saving presentations, working with different views, working with slides – make a new slide, move, copy, go to a specific slide, layout, adding and formatting text, adding clipart and other pictures, designing slide show, tools – meeting minds, presentation conference.

UNIT – IV

Ms Access – Introduction to Access, working with databases, queries, tables, forms, reports, macros and charts Internet – Basics of internet, basics of e mail, browsing

UNIT – V

Computer applications in nutrition, dietetics, nutritional assessment, menu planning and counseling

TEXT BOOK:

1. *Balagurusamy E.,* (1986), **Introduction to Computers Fundamentals of Computer Science,** TMH, New Delhi.

REFERENCE BOOKS:

1. *Saravanan N.,* (2002), **Computer Fundamentals with MS Office Applications,** Scitech, Chennai
2. *Kathleen Mahan L.,* (2000), **Krause Food Nutrition and Diet Therapy**, Saunders Publications, USA

15UTL41U	பகுதி – 1: தமிழ் தாள் – 4	நான்காம் பருவம்

Total Credits: 4
Hours/week: 5

(இரண்டு ஆண்டுகள் தமிழ் பயிலும் மாணவர்களுக்கு உரியது)

சங்க இலக்கியமும் நாட்டுப்புற இலக்கியமும்

அலகு – 1 எட்டுத்தொகை

1. குறுந்தொகை – (நெய்தல், பாடல் எண் : 57 – சிறைக்குடி ஆந்தையார்)
   (மருதம், பாடல் எண்: 61 – தும்பிசேர்கீரன்)
   (முல்லை, பாடல் எண்: 167 - கூடலூர்கிழார்)
2. கலித்தொகை – (குறிஞ்சிக்கலி, பாடல் எண் :16 – கபிலர்)
3. அகநானூறு – (பாலை, பாடல் எண் : 43 - நல்லந்துவனார்)
4. புறநானூறு – (பா.எண் : 279 – ஒக்கூர் மாசாத்தியார்,
   பா.எண்: 312 - பொன்முடியார்)

அலகு - 2 பத்துப்பாட்டு

1. முல்லைப்பாட்டு – நப்பூதனார்

அலகு - 3 நாட்டுப்புறவியல்

1. நாட்டுப்புறப்பாடல்கள் – அறிமுகம்
2. தாலாட்டுப் பாடல்கள்
3. தொழிற்களப் பாடல்கள்

அலகு - 4 இலக்கிய வரலாறு

1. பத்துப்பாட்டு
2. எட்டுத்தொகை

அலகு - 5 இலக்கணம்

1. அகத்திணை – விளக்கம்
2. புறத்திணை – விளக்கம்

பார்வை நூல்கள்

1 . தமிழ்த்துறை வெளியீடு
2. இலக்கிய வரலாறு – பேராசிரியர் முனைவர் பாக்யமேரி
3. நாட்டுப்புற இயல் ஆய்வு – சு. சக்திவேல்

15UHL41H	PART-I :HINDI-IV	SEMESTER-IV

Total Credits: 4
Hours/week: 5

(**Drama, One Act Play, General Essay**)

1. **Ladai** Sarveshwar Dayal Saksena Publisher : Vani Prakashan New Delhi – 110 002.

2. **One act play :** Ekanki Panchamruth (Excluding Bohr Ka Thara)
Publisher: Govind Prakashan Mathura

3. **General essay**

Book for reference : Aadarsh Nibandh Vinodh Pustak Mandir Hospital Road, Agra – 28

15UML41M	PART-I: MALAYALAM-IV	SEMESTER- IV

Total Credits: 4
Hours / Week: 5

Drama & Folklore Paper IV. Drama & Folklore

Unit I, II & III A Drama

Unit IV & V Folklore

TEXT BOOKS:

1. Unit I, II & III **Lankalakshm**i – *C. N. Sreekantan Nair* (D.C. Books, Kottayam).
2. Unit IV & V **Oru Vadakkanveeragatha** – *M.T. Vasudevan Nair* (Puthariyamkam, Sahithya Kairali Publications, Bhagavathinada P.O.

REFERENCE BOOKS:

1. **Natyasasthram,** *K.P. Narayana Pisharodi*, Trans. (Kerala Sahithya Akademi, Thrissur).
2. **Malayala Nataka Sahithya Charithram**, *G. Sankara Pillai* (Kerala Sahithya Akademi, Thrissur).
3. **Malayala Nataka Sahithya Charithram**, *Vayala Vasudevan Pillai* (Kerala Sahithya Akademi Thrissur).
4. **Natakam – Oru Patanam** (*C. J. Smaraka Prasanga Samithi*, Koothattukulam).
5. **Natakaroopacharcha**, *Kattumadam Narayanan* (NBS, Kottayam)
6. **Folklore** – *Raghavan Payyanadu* (Kerala Bhasha Institute, Trivandrum)

15UFL41F	PART-I: FRENCH-IV	SEMESTER-IV

Total Credits: 4
Hours/week: 5

French Language for Under-graduate Degree Programmes

Compétence Culturelle	Compétence de Communication	Compétence Grammatical
UNITÉ 6 – Problémes problems		
• Le bénvolat	• INTERACTION ORALE: Interroger sur la tristesse, I'abattement, exprimer sa sympathie, rassurer • RÉCEPTION ORALE: Comprendre une interview à la radio • RECEPTION ÉCRITE: Comprendre un test de magazine • PRODUCTION ÉCRITE: Écrire une letter a un(e) amie	• Les pronoms indfinis rien, quelque chose • Le verbe crier • Du pluriel: eau, eu, al • Se soigner, s'excuser, se renseigner, s'appeler • La phrase ngative: ne… plus, ne… jamais, ne… rien, ne… personne
UNITÉ 7 – C'est qui? C'est comment?		
• Les classes socials	INTERACTION ORALE: Décrire quelqu'un RECEPTION ORALE: Comprendre un bulletin météo RECEPTION ÉCRITE: Comprendre une courte interview PRODUCTION ÉCRITE: Écrire des notices biographiques	• Les adjectifs qualificatifs: Formes au masculin et au féminin • ll fait beau, il neige, il pleut… • Le verbe décrier • Les verbs en –indre • Les adjectifs possessifs féminins mon, ton, son devant voyelle ou h
UNITÉ 8 – Et après? Et après		
• La mémoire et l'histoire	• INTERACTION ORALE: Raconter une anecdote, une histoire, attire l'attention • RÉCEPTION ORALE: Comprendre une	• L'imparfait(2) • Les verbs en – oir • Les pronoms démonstratifs ça et cela • Prés de… Loin de…

	interview à la radio • RÉCEPTION ÉCRITE: Comprendre des faits divers • PRODUCTION ÉCRITE: Écrire une bréve	• La forme passive
UNITÉ 9 – Sûr et certain		
• L'université en France	• INTERACTION ORALE : Expreimer un point de vue, exprimer une certitude • RÉCEPTION ORALE : Comprendre et apprecier un poème • RÉCEPTION ÉCRITE : Comprendre un appel à participer à la vie collective • PRODUCTION ÉCRITE : • Ecrire une letter de motivation	• Le futur des verbes *parler, Avoir,être,voir* • Le verbe *valoir* • Par • Les pronoms démonstratifs *celui-ci, cella –là*
UNITÉ 10 – Peut –être…peut-être		
• Le système de santé en France	• INTERACTION ORALE : Exprimer une incertitude, exprimer l'évidence • RÉCEPTION ORALE : Comprendre et apprecier une chanson • RECEPTION ÉCRITE : Comprendre un débat d'idées • PRODUCTION ÉCRITE : Écrire au courier des lecteurs	• Les pronoms personnels objets,indirect *lui, leur* • L'impératif affirmative + COD et COL • Les verbes *en – ayer* • Linterrogation à inversion

TEXT BOOK:

1. *Marcella Di Giura Jean-Claude Beacco,* **Alors II .** Goyal Publishers Pvt Ltd 86, University Block ,Jawahar Nagar (Kamla Nagar), New Delhi – 110007.

15UEG42E	PART-II: ENGLISH-IV	SEMESTER- IV

Total Credits: 4
Hours/week: 5

OBJECTIVE:

To develop the language competence of the students.

1. To be enriched with functional English.

CONTENTS

UNIT -I

1. Mobile and Mixed-up – Anil Darker
2. My Vision for India – Dr. Abdul Kalam
3. Common Sense – Sedgwick, Woodworth

UNIT -II

SHORT STORIES

1. A Room 10 x 8 –K.S. Duggal
2. A Face on the Wall – E.V. Lucas

UNIT -III

SHORT PLAY

1. The Death Trap – H. H. Munro
2. The Never Never Nest – Cedric Mount

UNIT- IV

FUNCTIONAL ENGLISH

1. Communication Skills – Listening, Telephone, Resume & E-Mail
2. Interview & Group Discussion, Parts of the Exercises in each chapter.

UNIT -V

COMPOSITION TASKS

1. Public Speaking – speaking on an official occasion
2. Participating in a meeting
3. Airing grievances
4. Interview Skills
5. Conducting an Interview
6. Interviewing the expert
7. Net equittte
8. Negotiation Skills

TEXT BOOKS

1. *Nandini Nayar.2014* **Treasure Hunt.** Board of Editors, Foundation
   Books.
2. *Daniel, James.P.C*. **1989. English for Career Development, a Course in Functional English**, Orient Longman Pvt Ltd., Publications.

REFERENCE BOOKS:

1. *Rajamanickam. A.* 2001**. Everyman's English Grammar,** Macmillan.
2. *Krishna Mohan and Meera Banerji.* 2005. **Developing Communication Skills**.Macmillan.
3. *Wren.P.C and Martin***.**1998**. High School Basic Grammar and Composition.** Macmillan.

15UFN43A	CORE –VI: DIETETICS	SEMESTER- IV

Total Credits: 4
Hours/Week: 6

OBJECTIVES:

To enable students

1. Gain knowledge about principles of diet therapy and different therapeutic diets.
2. Develop aptitude for taking up dietetics as a profession.

CONTENTS

UNIT – I

Objectives of diet therapy - Role of a dietitian, Principles of diet preparation and counseling Normal diet in the hospitals – liquid, semi liquid, light, soft diet, bland diet and regular diet. **Different types of feeding** - Basic concepts of oral feeding, tube feeding, IV feeding, gastrostomy feeding.

UNIT – II

Therapeutic diets for the following disorders:

1. **Under weight** - definition, etiology, treatment
2. **Obesity** - definition, etiology, treatment.
3. **Diseases of the gastro intestinal tract**- ulcer, constipation and diarrhoea
4. **Diet in relation to deficiency diseases**-Protein calorie deficiency, vitamin A deficiency and anemia

UNIT – III

Diseases of the liver and gall bladder (risk factors and diet therapy)
a) Jaundice b) Hepatitis c) Cirrhosis d) Fatty liver
Diseases of the cardio vascular system (risk factors and diet therapy)
a) Atherosclerosis b) Arteriosclerosis c) Hypertension d) Congestive Heart Failure

UNIT – IV

Diabetes mellitus – Types, causes, symptoms, bio-chemical changes, insulin, hypo- glycemic drugs - types only, food exchange list, dietary management.

Diseases of the kidney and urinary tract
a. Acute and chronic nephritis
b. Nephrotic syndrome
c. Renal failure
d. Urinary calculi
Causes and dietary treatment of kidney diseases and dialysis

UNIT – V

Nutrition and cancer - Dietary guidelines for management
Diet in Allergy - Definition, classification, common food allergy, test of allergy, diet therapy. **Diet in febrile conditions** - Short duration e.g. Typhoid, Long duration e.g. Tuberculosis

TEXT BOOKS:

1. *Srilakshmi B. (*2014*),* **Dietetics***,* VII Edition. New Age International (P) Limited Publishers, New Delhi
2. *Shubhangini. A. Joshi, (*2002*)* **Nutrition and Dietetics,** Tata Mc Graw- Hill publishing Company limited, New Delhi

REFERENCE BOOKS:

1. *Carolynn E. Town send and Ruth A. Roth, (*2002*),* **Nutrition and Diet Therapy,** Delmar Publisher
2. *Sue Rod Williams,* (1989), **Nutrition and diet Therapy,** Times Mirror Mosby College publishing, Boston

15UBC4AA	ALLIED –IV: BIOCHEMISTRY	SEMESTER- IV

Total Credits: 4
Hours/Week: 3

OBJECTIVES:

1. Provides much information related to carbohydrate, fat and protein metabolism that takes place in our body.
2. Interrelationship between carbohydrate, fat and protein metabolism.
3. Role of purine and pyrimidines in nucleic acid metabolism.
4. Various disorders related to each metabolism

CONTENTS

UNIT- I

Buffers: Concept of acid base indicators, buffer systems of blood and body fluids, Components of the pH meter and the concept of pH
Chromatography: Paper, TLC, molecular sieve and affinity chromatography: their applications.

UNIT- II

Electrophoresis: Paper and Gel, principles and applications of colorimetry and spectrophotometry, **Isotopes:** Definition and units of radioactivity: examples of natural and heavy isotopes in biological investigations.

UNIT- III

Bioenergetics: Basic principles of thermodynamics – entropy, enthalpy and free energy; highenergy phosphates, oxidation-reduction reactions.
Mitochondria: - Respiratory chain and oxidative phosphorylation

UNIT- IV

Metabolic pathways:
Carbohydrate metabolism: Glycolysis, TCA cycle, HMP shunt, Glycogenesis and glycogenolysis **Lipid metabolism:** Beta-oxidation, biosynthesis of saturated fatty acids - Palmitic acid

UNIT V

Protein metabolism: General pathway of amino acid metabolism – deamination, transamination and decarboxylation. Urea cycle. Glycine and phenylalamine metabolism (structures not required)
Inter-relationship of carbohydrate, fat and protein metabolism (Flow chart only)

TEXT BOOKS:

1. *Deb A.C.,* (2008), **Fundamentals of Biochemistry**, 6th Edition –New Central Book Agency, Calcutta
2. *Chatterjea M. N.* (2006), **Textbook of Medical Biochemistry,** Edition 6, *Jaypee Brothers,* New Delhi.

REFERENCE BOOKS:

1. Lehninger, Nelson, (1975**), Biochemistry,** Edition II, Cox-CBS Publishers
2. *Murray R.K., Granner D.K,. Mayes P.A and Rodwell U. W.,* (2005) – **Harper's Biochemistry**: Lange Medical Publications, 26th edition.
3. *D.T. Plummer*, (2002), **An Introduction to Practical Biochemistry**, Edition I, TMH, New Delhi

15UBC4AP	ALLIED PRACTICAL – II: BIOCHEMISTRY	SEMESTER- IV

Total Credits: 2
Hours/Week: 3

I. QUALITATIVE ANALYSIS

1 .Analysis of carbohydrates:

a. Monosaccharides-Pentose- Arabinose. Hexoses- Glucose, Fructose
b. Disaccharides- Sucrose, Maltose,and LactosE
c. Polysaccharide-Starch.

2. Analysis of Amino acids:

a. Histidine b. Tyrosine. c. Tryptophan d. Arginine

II. CHARACTERISATION OF LIPIDS [Group experiment]

1. Determination of acid number.
2. Determination of iodine number.

III. SEPARATION TECHNIQUES [Demonstration]

1. Separation of amino acids by paper chromatography
2. Separation of sugars by thin layer chromatography
3. Separation of serum proteins by electrophoresis.

REFERENCES:-

1. **An Introduction to Practical Biochemistry** by *David T. Plummer*
2. **Laboratory Manual in Biochemistry** by *Pattabiraman and Acharya*
3. **Practical Biochemistry** by *J. Jayaraman*.

15UFN4SP	SKILL BASED PRACTICAL - I: DIETETICS	SEMESTER- IV

Total Credits: 2
Hours/Week: 3

OBJECTIVES:

To enable students

1. Plan, prepare and serve different therapeutic diets
2. Assess the nutritive value of the diets

CONTENTS

1. Weights and measures of foods.
2. Menu planning, prescription and preparation of
    a. Normal diet, regular diet, light diet, soft diet, full liquid diet, clear liquid diet and bland diet.
    b. Diet for obesity
    c. Diet for under weight
    d. Diet for anemia
    e. Diet for diseases of the GI tract – peptic ulcer, diarrhoea, constipation
    f. Diet for Cardio-vascular diseases- atherosclerosis, hypertension
    g. Diet for diseases of the kidney – nephritic and nephrotic syndrome, Diet before and after dialysis
    h. Diet for diabetes – Type I and II, Diabetes with CVD disease Diet in febrile conditions- Short duration – typhoid; long duration – tuberculosis
    i. Diet in liver diseases – Viral hepatitis and cirrhosis
3. Observation of a dietary department in a hospital.
4. Preparation of power point presentations on diet and disease conditions.

15UFN53A	CORE-VII: FOOD PRESERVATION	SEMESTER- V

Total Credits: 4
Hours/Week: 6

OBJECTIVES:

To enable students

1. Understand the principles of food preservation.
2. Acquire skills in methods of food preservation

CONTENTS

UNIT- I

Food Preservation - Definition, General Principles and Methods of Food Preservation - Classification of foods for processing, **Preservation by addition of sugar-** General principles and methods of preparation of jams, jellies and Marmalades, theory of gel formation, Preparation of preserves, squashes and syrups, **Preservation by addition of salt –** Pickling, Preparation of Indian Pickles, Sauerkraut. Status and scope of food processing industry in India in developing Entrepreneur

UNIT – II

Preservation by Use of High Temperature – Pasteurization, Sterilization and their types, Thermal death curve, calculation of process time, methods of heat transfer
Canning - steps, types of cans, advantages, disadvantages, **Bottling** - steps, advantages, disadvantages.
Food dehydration - concept of dehydration and sun drying, **Types of driers**- advantages, Disadvantages, **Principle of dehydration**-heat and mass transfer

UNIT – III

Preservation by use of Low Temperature, Types - Common types of cold storage, refrigeration- requirement of refrigerated storage, characteristic of refrigerant, refrigeration during transport, defects in cold storage.
Freezing - Principles and methods of freezing, Freeze drying. Advantages and disadvantages

UNIT – IV

1. **Preservation with chemicals**
    a. Mechanism of microbial inhibition, mechanism and action of preservatives in processed food
    b. Inorganic and Organic preservatives.
    c. Antibiotics
    d. Mold inhibitors.
    e. Antioxidants and its role.

UNIT – V

1. **Radiation of Foods**
    a. Sources of radiation, units of radiation
    b. Mode of action of irradiation, radiation effect on proteins enzyme system
    c. Microwave heating, properties of microwaves, applications in food processing and preservation.
2. **Preservation of Semi moist foods**:
    a. Principles
    b. Intermediate moist foods

TEXT BOOKS:

1. *Manoranjan Kalia, Sangita Sood,* (2012), **Food Preservation and Processing,** Edition II, Kalyani Publishers, Ludhiana, India
2. *Vijaya Khader*, (1999), **Preservation of Fruits and Vegetables,** Edition I, Kalyani Publishers, Ludhiana, India

REFERENCE BOOKS:

1. *Sivasankar B.,* (2002), **Food Processing and Preservation,** , Edition I, PHI, New Delhi
2. *NIIR Board,* (2008), **The Complete Technology book on Processing,** *Dehydration, Canning, Preservation of Fruits and Vegetables,*

15UFN53B	CORE -VIII : FOOD MICROBIOLOGY	SEMESTER- IV

Total Credits: 4
Hours per Week: 6

OBJECTIVES:

The course is used to study

1. The nature of foods and the causes of deterioration,
2. The principles underlying food processing and the improvement of foods for the consuming public.

CONTENTS

UNIT – I

Food and Microorganisms – Important microorganisms in food (Bacteria, Mold and yeasts); Factors affecting the growth of microorganisms in food – pH, moisture, oxidation – Reduction potential, Nutrient content and Inhibitory substances and biological structure.

.UNIT - II

Microbiology in Food Sanitation – Bacteriology of Water – Sewage and waste treatment Disposal – Microbiology of Food Product – Good Manufacturing Practices – Hazard Analysis – Critical Control Points – Health of Employees.

UNIT -III

Spoilage of food - cereals, vegetables, fruits, egg and milk – canned foods.

UNIT – IV

Fermented food – Bread, fermented fish and meat products – Fermented dairy products – Yoghurt and cheese. Fermented beverages: Wine and beer

UNIT- V

Food borne diseases – Food poisoning and Food borne infections – Bacterial and Mycotoxins- Investigation of food poisoning outbreaks

TEXT BOOKS:

1. *Frazier. W.C and D.C Westhoff.* 1978. **Food Microbiology**. 3rd ed. Tata Macgraw Hill publishing Co., New Delhi.
2. *Adams M.R. and Moss M. O.,* 2000. **Food Microbiology** 2nd edition. Panima Publishers.

REFERENCE BOOKS:

1. *Roger.Y.Stainer*. 2003. **Basic Food Microbiology**. 2nd edition, CBS Publishers.
2. *Jay,J.M* . 1991. **Modern Food Microbiology** 4th edition. Van Nostra and Rainhokdd Co.

15UFN53C	CORE- IX: FOOD PROCESSING	SEMESTER- V

Total Credits: 4
Hours/Week: 5

OBJECTIVES:

1. To enable students to learn different food processing and preservation techniques.

CONTENTS

UNIT I

Rice Technology - Production, processing, milling of rice, parboiling, processes, by products of rice milling and their utilization, Nutrient loss during processing.
Wheat Technology - Production, processing, manufacture of breakfast cereals
Millets - Production, processing

UNIT II

Pulses - Production, types of processing of different pulse products - Soya bean Processing.
Technology of oil seeds - Processing, meal concentrates and isolates, Fats from non-traditional oil seeds, rice bran oil, processing of vegetable oils, vanaspati with low Trans fatty acids and hydrogenation of fats.

UNIT III

Mushroom - Production, processing, utilization.
Meat - Production, processing,
Poultry - Production, preparing poultry for consumption, packaging.
Fish and Egg - Production, effect of handling practices, storage of eggs, manufacturing and packaging of egg products

UNIT IV

Vegetables - Drying techniques –drum drying, vacuum puffing, foam mat drying, freeze drying, accelerated freeze drying.
Fruits- Sun drying of banana and grapes; Mechanical dehydration – use of kiln drier and tunnel drier

UNIT V

Latest technologies in food preservation – principles, advantages and disadvantages only - **Non - thermal processes** - ultrasound method, nanotechnology, oscillating magnetic field, Electric field pulses, high pressure processing, high hydrostatic pressure technique membrane technology, ohmic heating of foods

TEXT BOOKS:

1. *Subbulakshmi and Shobha Udipi*, (2001), **Food Processing and Preservation Technology,** Edition I, New Age International Publications, New Delhi
2. *Fellows P. J.* (2000), **Food Processing Technology,** Edition II, Wood Head Publishing Limited, England.

REFERENCE BOOKS:

1. *Sivasankar B.,* (2002), **Food Processing and Preservation,** Edition I, PHI, New Delhi
2. *Mridulla Mirajkar,* (2002), **Food Science and Processing Technology,** Volume I and II, Edition I, Kanishka Publishers, New Delhi

15UFN53D	CORE- X: FUNDAMENTALS OF FUNCTIONAL FOODS AND NEUTRACEUTICALS	SEMESTER- V

Total Credits: 4
Hours/Week: 6

OBJECTIVES:

This course is designed to enable students to:

1. Gain knowledge about functional foods and Neutraceuticals
2. Have thorough understanding about the health effects
3. Be familiar with applications in industry.

CONTENTS

UNIT I

Functional Foods and Neutraceutical - Definition, Historical perspective, scope and future prospects, Classification, applied aspects of the functional foods and neutraceutical Sciences. Sources, Relation of functional foods and Neutraceuticals (FFN) to foods and drugs

UNIT II

Functional Foods

1. Herbs as functional foods - neem, ginseng, Licorice, St. John's Wort, Echinacea, hibiscus, lotus, Ginkgo biloba
2. Health effects of flax seeds, grapes, soy, fish, mushroom, algae, chlorophyll, green tea, berries ad caffeine

UNIT III

Definition, Classification, properties and functions of neutraceuticals
Alkaloids, Phytoesterogens, Antioxidants, Polyunsaturated Fatty Acids, Polyphenols, Glusocinolates, Carotenoids, lycopene

UNIT IV

Probiotics, probiotics and symbiotic – presence in natural foods, usefulness and effects, effect of processing, food supplements and products

UNIT V

Neutraceutical for cognitive decline, arthritis, osteoporosis, circulatory problems, hypoglycemia, cancer and ulcer
Research Frontiers in Functional foods and neutraceuticals

TEXT BOOKS:

1. *Wildman, R.E.C.* ed. (2000) **Handbook of Nutraceuticals and Functional Foods,** CRC Press, Boca Raton
2. *Jeffery H. W.* (2002), **Methods of Analysis for Functional Foods and Neutraceuticals,** Edition I, CRC Press, New York

REFERENCE BOOKS:

1. *Anil Kumar Dhimain*, (2004), **Common Drug Plants and Ayurvedic remedies,** Edition I, Relience Publishing House, New Delhi
2. *Andreas M. P.* (1999), **Antioxidant Status, Diet, Nutrition and Health,** Edition I, CRC, New York

15UFN5SP	SKILL BASED PRACTICAL -II: FOOD PRESERVATION AND QUALITY CONTROL	SEMESTER- V

Total Credits: 2

Hours/Week: 3

1. Analysis of pectin in foods.
2. Analysis of stages of sugar cookery.
3. Methods of Food Preservation using salt and sugar.
    i. Pickles
    ii. Chutney
    iii. Sauce
    iv. Ketchup
    v. Jams
    vi. Jellies
    vii. Marmalades
    viii. Preserves
    ix. Squashes and cordial
4. Drying and Dehydration
    i. Vadams and vathal
5. Food Adulteration tests for some common foods.
    i. Milk
    ii. Honey
    iii. Turmeric powder
    iv. Chilli powder
    v. Pepper
    vi. Coffee powder
    vii. Butter and ghee
    viii. Edible oil
    ix. Green peas
    x. Jaggery
    xi. Wheat flour
6. Preservation and bottling of fruit and vegetable products.
7. Preservation by using chemicals
8. Sensory analysis of preserved and processed foods.
    i. Taste sensitivity test

15UFN63A	CORE –XI: COMMUNITY NUTRITION	SEMESTER- VI

Total Credits: 4
Hours/Week: 6

OBJECTIVES:

To enable the students

1. Know about the application of basics of nutrition in the community
2. Gain knowledge of community nutrition programmes of national and international organization.

CONTENTS

UNIT I

Definition - Community, family, village and block
Meaning of optimum Nutrition, **Malnutrition**- Under nutrition and over nutrition, Characteristics of community, IMR, MMR, morbidity
Causes of malnutrition-Factors contributing to malnutrition in the community – food habits, customs and practices, availability of food, Socio-economic factors, Housing

UNIT II

Assessment of the nutritional status of the community - direct and indirect methods - Anthropometry, Clinical and Biochemical, Diet Surveys
Nutritional problems of women and men- Anemia, Vitamin A deficiency, B-complex Deficiency, Lathyrism

UNIT III

Nutritional problems of infants and children- PEM - Marasmus and Kwashiorkor, Vitamin A deficiency, B-complex deficiency diseases, **other problems**- Goitre, fluorosis and anemia

UNIT IV

Nutrition intervention programmes - ICDS: Objectives and services, Noon meal programme, TINP, SNP, Vitamin A prophylaxis. National Organization- Role of ICMR, NIN International organization- WHO, FAO, UNICEF
Health Care - PHC, ESI

UNIT V

Home Science - Meaning and Objectives, Role of Home-Scientists in rural development with reference to ongoing programmers like Family Welfare Programme, **Adult Education for community** - different methods, advantages and disadvantages, **Nutrition education**- merits and demerits of different methods of education

TEXT BOOKS:

1. *Vinodini Reddy, Praihad Rao, Gowrinath Sastry, J. and Kashinath, K.C.,* (1993). **Nutrition Trends in India**, N1N, Hyderabad,
2. *Park and Park,* (1995), **Text book of Preventive and Social Medicine**, Banarsidas Published by Jahalpu,

REFERENCE BOOKS:

1. *Michael J. Gibney*, (2004), **Public Health Nutrition,** Edition I, Black Well Scientific Publications, Oxford
2. *Arvind Wadhwa*, (2003), **Nutrition in the Community,** Edition 1, Elite Publications, New Delhi

15UFN63B	CORE- XII: FOOD SERVICE MANAGEMENT	SEMESTER- VI

Total Credits: 4
Hours/Week: 6

OBJECTIVES:

To enable students

1. Understand the principles of planning, organizing and controlling in food service institutions
2. Develop skills in meal planning to catering institutions
3. Understand the principles of sanitation and hygiene.

CONTENTS

UNIT- I

Different types of catering institutions and services, classifications of food service institutions according to

a. **Function**: Profit oriented, service oriented and public health facility oriented.

b. **Method of processing**: Conventional systems, Commissary system, fast food service system.

c. **Service of food**: Self service, tray service, waiter-waitress services

UNIT- II

Organization - Types and principles, organizational structure for catering institutions. **Management** - Definition, principles and techniques of effective management, leadership and managerial abilities. **Tools of management**-organizational chart, work study and work improvement.

UNIT- III

Personnel Management - Methods of selection, orientation, training, supervision and motivation of employees, importance of good human relations, legal aspects of catering.

UNIT- IV

Cost control - Principles and methods of food cost control.
Financial management –Factors affecting food, labor, operating and overhead cost, budget, inventories.
Sanitation and safety-significance of hygienic management in food preparation and service, sterilization, pest control, garbage disposal.
Health care of food service personnel, safety measures to be adopted in foodservice.

UNIT- V

Art in food service - Design selection-structural and decorative, Elements of design, principles of design, their application in food service institutions
Color - Qualities of color, color schemes, flower arrangement-application of art principles in arranging flowers, styles and types.
Table service - Application of art in table service
Home furnishing - With special reference to furniture and accessories, selection, factors to be considered and current trends

TEXT BOOKS:

1. *Sushma Gupta***,** (2013), **Textbook of Family Resource Management,** Edition 9, Kalyani – New Delhi
2. *Sethi and Mahan S*. (2001), **Catering Management: An Integrated Approach,** Edition II, John Wiley and Sons, New York.

REFERENCE BOOKS:

1. *Joan C. Branson*, (2004), **Hotel, Hostel and Hospital House Keeping,** Edition 5, Book Power – London
2. *Sudhir Andrews,* (2008), **Textbook of Hotel, House Keeping Management and Operations,** Edition I, TMH, New Delhi

15UFN63P	CORE PRACTICAL –III: NUTRITION	SEMESTER- VI

Total Credits: 4
Hours/Week: 3

Qualitative Analysis

1. Estimation of Carbohydrates – Hexoses – Glucose, Fructose and galactose
2. Total protein
3. Minerals – Calcium, Iron, phosphorus, magnesium and sulphur

Quantitative Analysis

1. Demonstration of Colorimeter
2. Determination of carbohydrates by Anthrone method
3. Demonstration of Protein content in foods.
4. Estimation of fibre content in any one food.
5. Estimation of Ascorbic Acid content in Citrus fruit juice.
6. Estimation of ash content in any one food
7. Determination of Calcium content in milk
8. Estimation of Iron content in any one food.
9. Estimation of Phosphorous content in any one food.
10. Determination of acid number of oils.
11. Determination of saponification number

15UFN6SP	SKILL BASED PRACTICAL - IV: FOOD PRODUCT DEVELOPMENT	SEMESTER- VI

Total Credits: 2
Hours/week: 3

1. Need and type of food consumption trend
2. Sensory evaluation (difference scales) and selection
    i. Difference test – paired comparison, Duo-trio, triangle
    ii. Rating test – Ranking and Hedonic
3. Innovative and value added food sample preparation and standardization from four food group system (4 samples from each group given below)
    i. Cereals, millets and pulses
    ii. Milk and animal products
    iii. Vegetables and fruits and
    iv. Oils, fat and nuts

3. Analysis of relevant Physico-chemical properties of value added products
4. Analysis of Nutrient Evaluation of value added products
    i. Energy
    ii. Carbohydrates
    iii. Protein
    iv. Fat
    v. Fiber
5. Shelf Life study
    i. Total Microbial count
    ii. Organoleptic evaluation (until disagreeable sensory quality arises)
6. Bulk preparation
7. Cost calculation, packaging and labeling
8. Popularization and consumer acceptance

15UFN5EA	ELECTIVE - I: FOOD SAFETY AND QUALITY CONTROL	SEMESTER- V

Total Credits: 4
Hours/week: 4

OBJECTIVES:

To enable the students to

1. Study about the control of quality and use of additives
2. Gain Knowledge on standards for food quality and food laws.

CONTENTS

UNIT-I

Principles of Quality control of food –Raw material control, processed control and finished product inspection.
Leavening agents - classification, uses and optimum levels
Food additives - Preservatives, colouring, flavouring, sequestering agents, emulsifiers, antioxidants

UNIT-II

Standardization systems for quality control of foods-National and International standardization system, Food grades, Food laws-compulsory and voluntary standards
Food adulteration - Common adulterants in foods and tests to detect common adulterants

UNIT-III

Standards for foods – Cereals and pulses, sago and starch, milk and milk products, Coffee, tea, sugar and sugar products

UNIT-IV

Methods for determining quality - Subjective and objective methods
Sensory assessment of food quality-appearance, color, flavour, texture and taste, different methods of sensory analysis, preparation of score card, panel criteria, sensory evaluation room

UNIT-V

Food safety, Risks and hazards: Food related hazards, Microbial consideration in food safety, HACCP-principles and structured approach. Chemical hazards associated with foods. FSSAI

TEXT BOOKS:

1. *Mahindru S.N.* (2000), **Food Safety,** Edition I, TMH, New Delhi

2. *Philip R. A.,* (1999), **Food Flavorings,** Edition I, An Aspen Publications, Mary Land

REFERENCE BOOKS:

1. *Sriramakanna,* **(2003), Food Standards and Safety in Globalised World**, Edition I, New Central Book Agencies Private Limited, New Delhi

2. *Mahindru S. N.,* (2000), **Food Additives,** Edition I, TMH, New Delhi

15UFN5EB	ELECTIVE -I : FOOD HYGIENE AND SANITATION	SEMESTER- V

Hours/week: 4
Total Credits: 4

OBJECTIVES:

1. Design food hygiene and sanitation measures to control the spread of microorganisms.
2. Explain the links between water, sanitation and health.

CONTENTS

UNIT-I

Food hygiene
General principle of food hygiene, Hygiene in rural and urban areas in relation to food preparation, personal hygiene and food handling habits, Place of sanitation in food plants, **Sanitary aspects of building and equipment:** Plant layout and design, Comparative studies on sanitary fabrication of different types of processing equipments.

UNIT-II

Safe and effective insect and pest control
Extraneous materials in foods, Principles of Insects and pests control, Physical and chemical methods of control, **Effective control of micro-organisms:** microorganisms important in food sanitation, micro-organisms as indicator of sanitary quality

UNIT-III

Sanitary aspects of water supply
Source of water, quality of water, water supply and its uses in food industries, Purification and disinfection of water, preventing contamination of potable water supply

UNIT-IV

Cleaning practices

Effective detergency and cleaning practices: Importance of cleaning technology, physical and chemical factors in cleaning, classification and formulation of detergents and sanitizers, cleaning practices

UNIT-V

Sanitation practices

Sanitary aspects of waste disposal, Establishing and maintaining sanitary practices in food industry, sanitation principle and the requirements for a food sanitation program, role of sanitation, general sanitary consideration and sanitary evaluation of food plants

TEXT BOOKS:

1. *David ME. S.* (1998), **Essential of Food Safety and Sanitation,** Edition I, Prentice Hall, New Jercy
2. *S. Roday*., (1999), **Food Hygiene and Sanitation in Food Industry,** Edition I, TMH, New Delhi

REFERENCE BOOKS:

1. *Asmita T.,* (2011), **Catering Science and Food Safety,** Edition I, Anthor
2. *Swaminathan M, (*1996*),* **Hand Book of Food and Nutrition,** Bangalore Printing Publishing Company, Bangalore

15UFN5EC	ELECTIVE - I: BAKERY	SEMESTER- V

Total Credits: 4
Hours/week: 4

OBJECTIVES:

To enable the students

1. Understand the science and technology of baking
2. Understand the role of different ingredients in baking
3. Develop skills in planning and maintenance of a bakery institution.

CONTENTS

UNIT- I

Baking - Definition, Principles of baking, classification of baked foods. Types of equipments in baking industry, cleaning and sanitizing methods of baking equipments, baking temperature of different products, operation techniques of different baking equipments.

UNIT- II

Ingredients and their role in baking - Flour, Yeast, sugar, egg, butter, salt, baking powder, colouring, flavouring agents. List of standard colouring and flavouring agents

UNIT- III

Preparation of baked foods - Quick breads, cakes and its varieties, different types of biscuits, cookies and pastries

UNIT -IV

Decoration of baked foods - Icing- Types of Icing used in different bakery product, Role of other ingredients used in icing

UNIT- V

Baking unit/ plant layout and design of a baking unit sanitation and hygiene, Types of packaging materials used for bakery products, method of packaging.

TEXT BOOKS:

1. NIIR – New Delhi, NIIR Board, (2005), **Complete Technology Book on Bakery Products,**
2. *Yogambal A.,* (2009), **Theory of Bakery and Confectionery,** Edition I, PHI, New Delhi.

REFERENCE BOOKS:

1. *Friberg B.,* (2002), **Modern Pastry Chef,** Edition IV, John- Wiley and Son, New York
2. *Cerrole C.* (2000), **Essential Baking,** Edition I, Hermes House, New Delhi

15UFN6EA	ELECTIVE - II: POST HARVEST TECHNOLOGY	SEMESTER- VI

Total Credits: 4
Hours/week: 6

OBJECTIVES:

To enable students

1. Understand the safety control measures in handling foods from harvest to consumption agencies of control.
2. Knowledge about food processing methods.

CONTENTS

UNIT- I

Introduction to Post Harvest Technology - Definition, importance and problem encountered.
Buffer stock – definition, quantity of stores available
Governmental measures to augment food production- need for food conservation.
Food loss in the post harvest period, extent of losses, loss in the field, threshing yard, storage, marketing loss
Role of Post Harvest Technology in combating malnutrition in India

UNIT- II

Agents Causing Food Losses - Physical agents (moisture, temperature), Chemical losses, biological losses- insects- insects attacking food grains - types and life cycle, damage caused to food grains and detection of insect infestation, rats and rodents, birds, animals- Nature of damage, identification

UNIT- III

Control of Spoilage Agents - Importance and methods of sanitary handling, physical, chemical, biological and other means of control of insects, rats and rodents and birds
Insect control methods- Physical methods and chemical methods including fumigation techniques

Handling and Transport of Food Commodities - Traditional and improved methods, Nutrient losses in spoiled grains and National program to save grains

UNIT- IV

Storage of Grains - Importance of storage structures- requirements, traditional and modern and underground and above ground storage and their improvements, FCI godowns, PDS

Agencies Controlling Food Losses - Role of SGC, FCI, CWC, SWC, IGSI in controlling food losses

UNIT- V

Food Processing of Selected Food Items – wheat, rice, breakfast cereals, pulses, oilseeds.

ACTIVITY

1. Visit to FCI
2. Visit to Processing Mill (Cereal and Pulse)

TEXT BOOKS:

1. *N.W.Potter,* **,** (1973), **Food Science**- The A VI Publishing Co., the Westport
2. *Chakravarthy A,* (1981), **Post Harvest Technology of Cereals, Pulses and Oilseeds,** Edition I, Oxford and IBH, New Delhi.

REFERENCE BOOKS:

1. *Fellows P. J.* (2000), **Food Processing Technology, ,** Edition II, Wood Head Publishing Limited, England
2. *Sivasankar B.,* (2002), **Food Processing and Preservation,** Edition I, PHI, New Delhi

15UFN6EB	ELECTIVE –II: QUANTITY FOOD SERVICE AND PHYSICAL FACILITIES	SEMESTER- VI

Total Credits: 4
Hours/week: 6

OBJECTIVES:

To enable students

1. Understand the physical requirements for quality food production
2. Gain knowledge and develop skills in handling food service equipment
3. Understand the basics of quantity food production and meal planning.

CONTENTS

UNIT- I

Floor planning and layout – characteristics of typical food service facilities. **Floor plan** – physical planning, space allocation for the various areas and flow of traffic through receiving, storage, preparation, service and dish washing areas. Working heights and dimensions of work centers, lighting, ventilation and pest – rodent control

UNIT-II

Materials - Basic materials used in the manufacture of equipment, finishes and insulation, Strength and limitation of materials.

UNIT-III

Equipment - Equipment required for quantity food service-major and minor equipment with reference to food storage, preparation, service and cleaning. Factors influencing their selection and purchase, Arrangement of equipment in work centers, use, care and maintenance of equipment, Transition from traditional to modern equipment

UNIT-IV

Menu Planning - Menu-principles involved in planning menu, types of menu.
Fuel: Cooking fuels-selection, advantages, limitations, safety measures and fuel saving techniques.

UNIT-V

Quantity food preparation – Selection, purchasing and storage of foods, standardization of recipe, portion control, utilization of left over foods, **Marketing of foods –**Importance and need for advertisement

TEXT BOOKS:

1. *Sethi and Mahan S.* (2003), **Catering Management,** Edition II, John Wiley and Sons, New York .
2. *Sushma Gupta,* (2013), **Textbook of Family Resource Management,** Edition 9, Kalyani – New Delhi

REFERENCE BOOKS:

1. *Asmita T.,* (2011), **Catering Science and Food Safety,** Edition I , Anthor
2. *Sudhir Andrews*, (2008), **Textbook of Hotel, House Keeping Management and Operations,** Edition I, TMH, New Delhi

15UFN6EC	ELECTIVE - II: HEALTH AND FITNESS	SEMESTER- VI

Total Credits: 4
Hours/week: 6

OBJECTIVES

To enable students

1. Understand the importance of health for quality living
2. Acquire knowledge about the role of food and exercise for sound health.

CONTENTS

UNIT- I

Health – Definition, concept/ meaning of health and factors affecting health. Health promotion: Definition of food, Nutrition, Nutrients and Nutritional status. **Functions of food –** Physiological, psychological and socio - cultural functions, constituents of food and their functions

UNIT- II

Physical Fitness Assessment: body composition - Simple (body mass index), Intermediary (skin fold thickness for fat mass, bone mass and muscle mass) and instrumental (bio electrical impedance)
Health education – Definition, importance of health education, personal hygiene **Physical education –** Meaning and scope, role of gymnastic exercises and yoga in improving health, Difference between yoga and other gymnastic exercises

UNIT- III

Sports nutrition –Introduction to kinanthropometry, Requirements during training and performance for athletes and endurance games

UNIT- IV

Aerobic and anaerobic exercise, fuel for exercise, glycogen load
Exercise to maintain fitness – demand in exercise and sports. Ergogenic aids in Sports and Exercise. Determination of Energy Expenditure in Sports and Exercise

UNIT -V

Health club equipments and activities – Tread mill, hammer strength, steppers, cycles, body sculpting, kick boxing, Reebok ridge rocker, hanging, hand grips, swing, climbing and lifting weight.

TEXT BOOKS:

1. *Kathleen M. L. Krause's,* (2004), **– Food, Nutrition and Diet therapy,** 11th Edition, WB Saunders Company, Philadelphia
2. *Williams M. H.,* (2002), **Nutrition for Health, Fitness and Sports,** Edition 5, Mc Craw Hill Book Company, New Delhi

REFERENCE BOOKS:

1. *Judy A. D.* (2002), **Nutritional assessment for Athletes,** Edition I, CRC Press, New York
2. *Liane M. S.* (2001), **Nutrition, Exercise and Behaviour,** Edition I, Wordsworth, Australia

15UFN6ED	ELECTIVE -III: CLINICAL NUTRITION AND COUNSELLING	SEMESTER- VI

Total Credits: 4
Hours/week: 6

OBJECTIVES

To enable the students

1. Gain knowledge and develop skills in assessing the patients.

2. Acquire skills in menu planning, nutrient calculation and feeding techniques.

CONTENTS

UNIT- I

Patient Assessment –Pre – and Post treatment- Anthropometric assessment, Biochemical assessment, immunity assessment, Clinical observations, Medication history, Dietary assessment methods-24 hour recall method, day to day weight changes. Day to day recording of patient's diet and fluid intake and its implications

UNIT- II

Therapeutic Menu Planning - Definition of diet therapy, factors to be considered while planning therapeutic diet, Principles of menu planning, Uses of food groups, food guide pyramid
Diet Modifications - Principles of diet modification, modification of the normal diet, impact of psychological factors in improving patient's health, nutritional counseling.

UNIT -III

Diet calculation - Definition and objectives of exchange list, recommended dietary allowance, use of food consumption assessment, calculation of nutrients intake using nutritive value book.

UNIT- IV

Normal and abnormal physiological and biochemical parameters and their interpretation
a. Blood pressure, pulse rate
b. Urine and stools- routine, albumin, sugar and urine culture

c. Blood- sugar (fasting, post-prandial, random), urea, creatinine, lipid profile, protein, A:G ratio, bilirubin, SGPT, SGOT, uric acid, calcium phosphate, alkaline phosphatase, Hb, CBC, PCV, ESR, Peripheral smear, serum iron and ferritin, TIBC. Imaging and endoscopy tests **–**X ray, ultrasound scan, CT scan, endoscopy, colonoscopy, biopsy.

UNIT- V

Intensive care nutrition, Nutrition in trauma and burns
Parenteral Nutrition - Definition and administration techniques, TPN formulas, advantages and complication of TPN.
Enteral Nutrition - Definition, types of tube feeding, formulas for enteral feeding, problems encountered during enteral feeding and advantage of tube feeding. Compulsory ten days internship at a dietary department of a hospital during the SEMESTER-

TEXT BOOKS:

1. *Shubhangini A.Joshi*, (2002), **Nutrition and Dietetics,** 2nd Edition, Tata McGraw Hill Publishing Company Ltd.
2. *Jacqueline C.,* (2011), **Dietitians Guide Assessment and Documentation,** Edition I, Jones and Bartlett, London

REFERENCE BOOKS:

1. *Krause Food*, (2000), **Nutrition and diet therapy,** 10th Edition, W.B. Sauders Company
2. *Joshi Y. K.* (2003), **Basic Clinical Nutrition ,** Edition I, J. P. Brothers, New Delhi

15UFN6EE	ELECTIVE - III: HOSPITAL FOOD SERVICE	SEMESTER- VI

Total Credits: 4
Hours/Week: 6

OBJECTIVES

To enable students

1. Understand the principles of planning, organizing and controlling hospital food service.
2. Develop skills in meal planning, production and service.
3. Understand the principles of sanitation and hygiene.

CONTENTS

UNIT- I

Types of service in hospitals – Food service definition and its types, equipment used for serving the food in hospitals and hygienic role of persons delivering Food

UNIT- II

Physical requirements:
Kitchen area – Size and type of kitchen, design of kitchen, ventilation, lighting, flooring, carpets, wall covering and sample layout of kitchen.
Storage area – Meaning, types of storage, infrastructure, sanitary measures and safety storage of food materials.
Equipment - Equipment required for hospital food service - major and minor equipment with reference to food storage, preparation, holding and food service.

UNIT- III

Purchasing – Meaning of purchase and buying methods.
Receiving and Storing – Importance of receiving raw materials and storage procedures
Production – Menu planning for patients and process of food production, holding of foods – methods and specifications
Cleaning – Meaning of cleaning, dishwashing, types of cleaning and sanitizing agents, bleaches and disinfectants

UNIT- IV

Management - Definition, principles and techniques of effective management, leadership and managerial abilities (in a hospital and dietary). **Tools of management –** organizational chart of the food service team of the hospital. The patient care team –role of medical and paramedical staff interaction, Food supply for attendant

Cost concept – Components and behaviors of cost

Cost control - Principles and methods of food cost control, labor, operating and overhead cost

Sample costing of a dish, methods and factors affecting pricing

UNIT- V

Accounting - Definition and principles. Journal and ledger, **Book of account –** Cash book, purchase book, sales book, purchase returns and sales returns book

TEXT BOOKS:

1. *Sethi M and Mahan S.* - (2006), **Catering Management an integrated Approach,** 2nd edition, John Wiley and Sons, New York.
2. *Sudhir Andrews,* (2008), **Textbook of Hotel, House Keeping Management and Operations,** Edition I, TMH, New Delhi

REFERENCE BOOKS:

1. *Mohini Sethi*, (2004), **Institutional Food Management,** Edition I, New Age International Pvt. Ltd, New Delhi
2. *Mohinder C.,* (2009), **Managing Hospitality Operations,** Edition I, Anmol, New Delhi

15UFN6EF	ELECTIVE - III: FOOD PACKAGING	SEMESTER- VI

Total Credits: 4
Hours/week: 6

OBJECTIVES:

1. To understand the need for food packaging and the recent trends in packaging materials and labeling.
2. Learn and gain knowledge on food packaging and applications during transportation.

CONTENTS

UNIT- I

Food packaging
Definition, functions of packaging materials for different foods, characteristics of packaging material. **Food packages –** bags, pouches, wrappers, tetra packs-applications.

UNIT- II

Packaging materials
Introduction, purpose, requirements, types of containers. **Modern packaging materials and forms**-Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, flexible packaging.

UNIT – III

Packages of radiation stabilized foods
Introduction, rigid containers, flexible containers, general methods for establishing radiation stabilization, **Radiation**- measurement of radiations
Biodegradable packaging material – biopolymer based edible firm.

UNIT - IV

Packages of dehydrated products
Orientation, metallization, co-extrusion of multilayer films, stretch, package forms and techniques, Aspectic packaging, retortable containers, modified and controlled atmosphere packaging, skin, shrink and cling

film packaging, micro-oven able containers, other package forms and components of plastics

UNIT - V

Packaging of finished goods
Weighing, filling, scaling, wrapping, cartooning, labeling, marking and trapping
Labeling: Standards, purpose, description types of labels, labeling regulation barcode, nutrition labeling, health claims, and mandatory labeling provision

TEXT BOOKS:

1. *Vijaya Khader,* (2001), **Text Book of Food Science and Technology,** Indian council of Agricultural research New Delhi,
2. *Srilakshmi B.,* (2007), **Food Science,** Edition IV, New Age International Publishers, New Delhi,

REFERENCE BOOKS:

1. NIIR Board, (2008), Food Packaging Technology Handbook, NIIR, Delhi.
2. NIIR Board, (2008), Handbook on Modern Packaging Industries, NIIR, Delhi

15UED34G	NMEC- I: NUTRITION IN HEALTH AND FITNESS	SEMESTER-- III

Hours/week: 2
Total Credits: 2

OBJECTIVES:

1. Obtain knowledge on role of food, nutrients, exercises, yoga in improving health
2. Obtain basic understanding on sports nutrition

CONTENTS

UNIT -I

Health – Definition, concept/ meaning of health and factors affecting health. **Food** - Definition of food, Nutrition, Nutrients and its functions and Nutritional status. **Functions of food –** Physiological, psychological and socio - cultural functions, constituents of food and their functions

UNIT- II

Physical Fitness – Definition, components of fitness
Physical Fitness Assessment: Simple (BMI), Intermediary (fat fold thickness) and Instrumental (Bio-electrical Impedance)
Cardio respiratory fitness – benefits of cardio respiratory endurance

UNIT- III

Exercise – Definition, benefits of active lifestyle, role of exercises in improving health, classification of exercise based on aerobic and anaerobic nature, fuel for exercise
Exercises to maintain fitness – push-ups, sit-ups, full squat, basic warm up, stretches and flexibility exercises

UNIT- IV

Yoga - Meaning ,scope of yoga and importance of yoga on health, classification, difference between yoga and other exercises, specific yoga asanas for obesity, diabetes and flexibility

UNIT- V

Sports Nutrition – definition, types of sports, Nutritional Requirements for athletes and endurance games, fluid and electrolyte balance, pre-, post and on game foods, concept of sport supplements

Health club equipments – Tread mill, cycles, kick boxing, elliptical and lifting weight.

TEXT BOOKS:

1. *Kathleen M. L. Krause's*– **Food, Nutrition and Diet therapy, 2004**, 11th Edition, WB Saunders Company, Philadelphia
2. *Williams M. H.,* **Nutrition for Health, Fitness and Sports, 2002,** Edition 5, Mc Craw Hill Book Company, New Delhi

REFERENCE BOOKS:

1. *Judy A. D.* **Nutritional assessment for Athletes, 2002**, Edition I, CRC Press, New York
2. *Liane M. S.* **Nutrition, Exercise and Behaviour, 2001,** Edition I, Wordsworth, Australia

15UED44G	NMEC –II: FOOD PRESERVATION	SEMESTER- IV

Total Credits: 2
Hours/week: 2

OBJECTIVES:

To enable students

1. Understand the principles of food preservation.
2. Acquire skills in methods of food preservation.

CONTENTS

UNIT- I

Fruits and Vegetables - Production, global India, General Principal of selection for processing, SWOT in food industry

UNIT- II

Food Preservation – Definition, General Principal and Methods of Preservation **by Addition of Sugar** – General Principal, Preparation of Jam and Squash

UNIT –III

Preservation by Addition of Salt - General Principal, Preparation of Pickles and fermented pickles. **Preservatives** – class I and II Preservatives

UNIT- IV

Preservation Using High Temperature: Pasteurization, canning and bottling
Dehydration – Advantages and Disadvantages

UNIT- V

Preservation Using Low Temperature: Refrigeration and Freezing Advantages and Disadvantages
Preservation by Radiation – Microwave heating, Application in Food Processing and Preservation

TEXT BOOKS:

1. *Manoranjan Kalia, Sangita Sood,* (2012), **Food Preservation and Processing,** Edition II, Kalyani Publishers, Ludhiana, India
2. *Vijaya Khader,* (1999), **Preservation of Fruits and vegetables,** Edition I, Kalyani Publishers, Ludhiana, India

REFERENCE BOOKS:

1. *Sivasankar B.,* (2002), **Food Processing and Preservation,** Edition I, PHI, New Delhi
2. *NIIR Board,* (2008), **The Complete Technology book on Processing, Dehydration, Canning, Preservation of Fruits and Vegetables**