



AMRITA
VISHWA VIDYAPEETHAM
DEEMED TO BE UNIVERSITY

SCHOOL OF
PHYSICAL SCIENCES

AMRITAPURI, BENGALURU, COIMBATORE, CHENNAI

DEPARTMENT OF SCIENCES

B.Sc. Honors

Food Science and Nutrition

CURRICULUM AND SYLLABI (2025)

(NEP 2020 Based Curriculum)

B.Sc. Honors
Food Science and Nutrition
CURRICULUM AND SYLLABI (2025)

Preamble

The preamble of the Undergraduate curriculum framework- 2023 underlines the historical perspective, philosophical basis and contemporary realities of higher education as enshrined in the NEP 2020 and endeavors to synchronize cornerstones while charting the road ahead for the state of higher education.

The undergraduate Curriculum framework-2023 (UGCF) for B.Sc (Hons) Food Science and Nutrition is meant to bring about systemic change in the higher education system in the University and align itself with the National Education Policy 2020. The following objectives of NEP are kept in perspective while framing UGCF

- To promote each student's holistic development in both academic and on academic spheres
- To provide flexibility to students so that learners have the ability to choose their learning trajectories and programs, and thereby choose their paths in life according to their talents and interests
- To eliminate harmful hierarchies among disciplines/fields of study and silos between different areas of learning
- Multidisciplinary and holistic education to ensure the unity and integrity of all knowledge
- To promote creativity and critical thinking and to encourage logical decision-making and innovation
- To promote ethics and human and constitutional values
- To promote multilingualism and the power of language in learning and teaching
- To impart life skills such as communication, cooperation, teamwork, and resilience
- To promote outstanding research as a corequisite for outstanding education and development

GENERAL INFORMATION

ABBREVIATIONS USED IN THE CURRICULUM

L – Lecture
T - Tutorial
P - Practical
Cr – Credits
LO – Learning Objective
CO - Course Outcome
PO – Programme Outcome
PEO - Programme Education Objective
PSO – Programme Specific Outcome
HUM - Humanities (including Languages and others)
SCI - Basic Sciences (including Mathematics)
CSE – Computer Science Engineering
CUL - Cultural Education
CES – Centre for Environmental Studies
CIR-Corporate and Industrial Relationship
DSC-Discipline Specific Core
DSE-Discipline Specific Elective
SEC-Skill Enhancement Course
VAC- Value Addition Course
GE- Generic Elective
AEC-Ability Enhancement Course

Course Outcome (CO) – Statements that describe what students are expected to know, and are able to do at the end of each course. These relate to the skills, knowledge and behavior that students acquire in their progress through the course.

Program Outcomes (POs) – Program Outcomes are statements that describe what students are expected to know and be able to do upon graduating from the Program. These relate to the skills, knowledge, attitude and behaviour that students acquire through the program. NBA has defined the Program Outcomes for each discipline.

PROGRAMME EDUCATION OBJECTIVE (PEO):

Food Science graduates will be able to:

PEO1: Perform well in applied nutrition fields including public health and clinical nutrition

PEO2: Serve in the core food industry, which leverages diverse food science domains including food chemistry, product development, safety & quality control.

PEO3: Contribute to the skilled manpower requirement in this field so as to address societal & national needs

PROGRAM OUTCOME (PO):

1. **Scientific Knowledge:** Apply the knowledge of biological sciences as a basis for understanding the role of food and nutrients in health and diseases.
2. **Design/development of solutions:** Design solutions for health and nutritional problems and design products that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.
3. **Environment and sustainability:** Understand the impact of food processing and preservation solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.
4. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the nutrition and health care practice.
5. **Individual and team:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
6. **Communication:** Communicate effectively on nutritional and health burdens with the scientific community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
7. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of health care management.

PSO FOR B.SC. HONS. FOOD SCIENCE AND NUTRITION

After the successful completion of the program, the students are expected to

PSO1: Comprehend the association between nutrients with physiology, diseases and dietary solutions.

PSO2: Apply knowledge and technical skills in assessing, evaluating and providing health care solutions for individuals and communities.

PSO3: Associate the theoretical knowledge and skills acquired to the food industry.

PSO4: Develop expertise to serve the society and nation

SEMESTER I

Offered by	NEP Category	Course Code	Course Title	LTP	Credits
SCI	DSC	25FSN101	Food Science & Experimental Foods	3 1 0	4
SCI	DSC	25FSN102	Principles of Nutrition	3 1 0	4
SCI	DSC	25FSN103	Food Processing Preservation– 1	2 2 0	4
SCI	DSC	25FSN181	Food Science & Experimental Foods (P)	0 0 3	1
HUM	SEC	24ENG101	English I	2 0 0	2
HUM	AEC		Language I	2 0 0	2
CUL	VAC	22ADM101	Foundations of Indian Heritage	2 0 1	2
CUL	VAC	22AVP103	Mastery Over Mind	1 0 2	2
			Total credits		21

SEMESTER II

Offered by	NEP Category	Course Code	Course Title	LTP	Credits
SCI	DSC	25FSN111	Nutrition Through life Span	3 1 0	4
SCI	DSC	25FSN112	Human Physiology	3 0 1	4
SCI	DSC	25FSN113	Food Processing and Preservation -II	3 1 0	4
SCI	DSC	25FSN114	Food Chemistry	3 0 0	3
SCI	DSC	25FSN182	Nutrition Through life Span (P)	0 0 3	1
SCI	DSC	25FSN183	Food Processing and Preservation (P)	0 0 3	1
SCI	DSE	25FSN184	Food Chemistry(P)	0 0 3	1
HUM	SEC	24ENG111	English II	1 0 2	2
HUM	AEC		Language II	2 0 0	2
CUL	VAC	22ADM111	Glimpses of Glorious India	2 0 1	2
			Total credits		24

SEMESTER III

Offered by	NEP Category	Course Code	Course Title	LTP	Credits
SCI	DSC	25FSN201	Nutritional Biochemistry	3 1 0	4
SCI	DSC	25FSN202	Clinical Nutrition and Dietetics – I	2 2 0	4
SCI	DSC	25FSN281	Nutritional Biochemistry (P)	0 0 3	1
SCI	DSC	25FSN282	Clinical Nutrition and Dietetics-I (P)	0 0 3	1
SCI	DSE		Professional Elective A*	3 0 0	3
SCI	GE		Generic Elective A#	3 0 0	3
CSE	SEC	25FSN203	Basics of Computer Applications	2 0 0	2
	GE		Free Elective 1**	2 0 0	2
CIR	AEC	23LSK201	Life Skills I	1 0 2	2
CUL	VAC		Amrita Value Programme I	1 0 0	1
			Total credits		23

SEMESTER IV

Offered by	NEP Category		Course Title	LTP	Credits
SCI	DSC	25FSN211	Food Microbiology	3 0 0	3
SCI	DSC	25FSN212	Clinical Nutrition and Dietetics - II	2 2 0	4
SCI	DSC	25FSN283	Food Microbiology (P)	0 0 3	1
SCI	DSC	25FSN284	Clinical Nutrition and Dietetics-II (P)	0 0 3	1
CES	AEC	24ENV200	Environmental Science and Sustainability	3 1 0	4
SCI	DSE		Professional Elective B*	3 0 0	3
SCI	DSE		Professional Elective C*	3 0 0	3
	GE		Free Elective 2**	2 0 0	2
CIR	AEC	23LSK211	Life Skills II	1 0 2	2
SCI	Community Outreach	25FSN290** *	Live in Labs ***	0 0 3	[3]
CUL	VAC		Amrita Value Programme II	1 0 0	1
			Total credits		24

SEMESTER V

Offered by	NEP Category	Course Code	Course Title	LTP	Credits
SCI	DSC	25FSN301	Food Product Development and Marketing	3 1 0	4
SCI	DSC	25FSN302	Food Service Management	3 1 0	4
SCI	GE		Generic Elective B#	3 0 0	3
SCI	DSC	25FSN303	Packaging and Labelling of Food Products	2 1 0	3
SCI	DSC	25FSN381	Food Product Development (P)	0 0 3	1
SCI	DSC	25FSN382	Food Service Management (P)	0 0 3	1
CIR	AEC	23LSK301	Life Skills III	1 0 2	2
SCI	Community Outreach/ DSE	25FSN390** *	Live in Labs ***/ Professional Elective A*	0 0 3/3 0 0	3
			Total credits		21

SEMESTER VI

Offered by	NEP Category	Course Code	Course Title	LTP	Credits
SCI	DSC	25FSN311	Community Nutrition	3 1 0	4
SCI	DSC	25FSN312	Analytical Instrumentation	2 0 0	2
SCI	GE		Generic Elective -A#	3 0 0	3
SCI	DSC	25FSN313	Food Product Evaluation	1 1 0	2
SCI	DSE		Professional Elective B*	3 0 0	3
SCI	DSC	25FSN314	Research Methodology and Bio Statistics	2 2 0	4
SCI	DSC	25FSN383	Food Analysis (P)	0 0 3	1
SCI	Project	25FSN399	Project (Additional for Exit Option)		6
	Project	25FSN398#	Internship#/Core elective (Continuing Students)		3
			Total credits		22/25
			Total credits(I+II+III+IV=V+VI)		135/138

SEMESTER VII

Offered by	NEP Category	Course Code	Course Title	LTP	Credits
SCI	DSC	25FSN401	Public Health Nutrition	2 2 0	4
SCI	DSE		Professional Elective- A*	3 0 0	3
SCI	GE		Generic Elective -B#	3 0 0	3
SCI	DSC	25FSN402	Nutraceuticals and Functional Foods	3 1 0	4
SCI	DSC	25FSN403	Food & Nutrition Research Techniques	3 1 0	4
SCI	DSE		Professional Elective- B*	3 0 0	3
SCI	DSC	25FSN481	Techniques of Experimental Nutrition	0 0 3	2
			Total credits		23

SEMESTER VIII

Offered by	NEP Category	Course Code	Course Title	LTP	Credits
SCI	DSC	25FSN411	Nutrition in Health and Fitness	3 1 0	4
SCI	DSE		Professional Elective- C*	3 0 0	3
SCI	GE		Generic Elective –A / B#	3 0 0	3
SCI	Project	25FSN499	Major Project		12
			Total credits		22
			Total Credits (I+II+III+IV+V+VI+VII+VIII)		180

* Professional Elective courses (A, B and C) are to be taken by each student, one each at the 3rd, 4th, 5th, 6th, 7th and the 8th semester, from the list of electives offered by the Department.

** Free Electives - This will include courses offered by Faculty of Humanities and Social Sciences/ Faculty Arts, Commerce and Media / Faculty of Management/Amrita Darshanam - (International Centre for Spiritual Studies).

*** Students undertaking and registering for a Live-in-Lab project, can be exempted from registering for an Elective course in the higher semester.

Generic Elective courses (A & B) are to be taken by each student, one each at the 3rd, 5th, 6th, 7th and the 8th semester, from the list of generic electives offered by the Department.

PROFESSIONAL ELECTIVES

Offered by	Category	Course Code	Course Title	LTP	Credits
ELECTIVES A					
SCI	DSE	25FSN331	Food Hygiene and Sanitation	3 0 0	3
SCI	DSE	25FSN332	Adolescence Health and Lifestyle	3 0 0	3
SCI	DSE	25FSN333	Nutrition for Athletes	3 0 0	3
ELECTIVES B					
SCI	DSE	25FSN341	Home-scale preservation of foods	3 0 0	3
SCI	DSE	25FSN342	Basics of Food Engineering	3 0 0	3
SCI	DSE	25FSN343	Career Opportunities in Food Science and Nutrition	3 0 0	3
ELECTIVES C					
SCI	DSE	25FSN351	Bakery and Confectionery	2 0 1	3
SCI	DSE	25FSN352	Hospitality Management	3 0 0	3
SCI	DSE	25FSN353	Food Safety and Quality control	2 1 0	3
CORE ELECTIVES					
Offered by	Category	Course Code	Course Title	LTP	Credits
SCI	DSE	25FSN361	Food Fortification	3 0 0	3
SCI	DSE	25FSN362	Food Industry Management	3 0 0	3
<u>GENERIC ELECTIVES</u>					
GENERIC ELECTIVE A					
Offered by	Category	Course Code	Course Title	LTP	Credits
SCI	GE	25FSN371	Food Toxicology	3 0 0	3
SCI	GE	25FSN372	Nutrition in Emergencies and Disaster Manageme	3 0 0	3
SCI	GE	25FSN373	Physical Chemistry of Food Constituents	3 0 0	3
GENERIC ELECTIVE B					
SCI	GE	25FSN375	Post-Harvest Technology	3 0 0	3
SCI	GE	25FSN376	Food Bio Technology	3 0 0	3
SCI	GE	25FSN377	Nutrition Education and Communication	3 0 0	3

LANGUAGES

	Paper I				Paper II		
24MAL101	Malayalam I	2 0 0	2	24MAL111	Malayalam II	2 0 0	2
24HIN101	Hindi I	2 0 0	2	24HIN111	Hindi II	2 0 0	2
24KAN101	Kannada I	2 0 0	2	24KAN111	Kannada II	2 0 0	2
24SAN101	Sanskrit I	2 0 0	2	24SAN111	Sanskrit II	2 0 0	2
24TAM101	Tamil I	2 0 0	2	24TAM111	Tamil II	2 0 0	2
24ENG100	Additional English – I	2 0 0	2	24ENG110	Additional English - II	2 0 0	2

AMRITA VALUE PROGRAMMES FOR UG PROGRAMMES

Course Code	Title	L-T-P	Credits
22ADM201	Strategic Lessons from Mahabharatha	1-0-0	1
22ADM211	Leadership from Ramayana	1-0-0	1
22AVP210	Kerala Mural Art and Painting	1-0-0	1
22AVP201	Amma's Life and Message to the modern world	1-0-0	1
22AVP204	Lessons from the Upanishads	1-0-0	1
22AVP205	Message of the Bhagavad Gita	1-0-0	1
22AVP206	Life and Message of Swami Vivekananda	1-0-0	1
22AVP207	Life and Teachings of Spiritual Masters of India	1-0-0	1
22AVP208	Insights into Indian Arts and Literature	1-0-0	1
22AVP213	Traditional Fine Arts of India	1-0-0	1
22AVP214	Principles of Worship in India	1-0-0	1
22AVP215	Temple Mural Arts in Kerala	1-0-0	1
22AVP218	Insights into Indian Classical Music	1-0-0	1
22AVP219	Insights into Traditional Indian Painting	1-0-0	1
22AVP220	Insights into Indian Classical Dance	1-0-0	1
22AVP221	Indian Martial Arts and Self Defense	1-0-0	1
22AVP209	Yoga and Meditation	1-0-0	1

FREE ELECTIVES OFFERED UNDER HUMANITIES / SOCIAL SCIENCE STREAMS				
Cat.	Course Code	Title	L T P	Credit
HUM	23CUL230	Achieving Excellence in Life - An Indian Perspective	2 0 0	2
HUM	23CUL231	Excellence in Daily Life	2 0 0	2
HUM	23CUL232	Exploring Science and Technology in Ancient India	2 0 0	2
HUM	23CUL233	Yoga Psychology	2 0 0	2
HUM	23ENG230	Business Communication	1 0 3	2
HUM	23ENG231	Indian Thought through English	2 0 0	2
HUM	23ENG232	Insights into Life through English Literature	2 0 0	2
HUM	23ENG233	Technical Communication	2 0 0	2
HUM	23ENG234	Indian Short Stories in English	2 0 0	2
HUM	23FRE230	Proficiency in French Language (Lower)	2 0 0	2
HUM	23FRE231	Proficiency in French Language (Higher)	2 0 0	2
HUM	23GER230	German for Beginners I	2 0 0	2
HUM	23GER231	German for Beginners II	2 0 0	2
HUM	23GER232	Proficiency in German Language (Lower)	2 0 0	2
HUM	23GER233	Proficiency in German Language (Higher)	2 0 0	2
HUM	23HUM230	Emotional Intelligence	2 0 0	2
HUM	23HUM231	Glimpses into the Indian Mind - the Growth of Modern India	2 0 0	2
HUM	23HUM232	Glimpses of Eternal India	2 0 0	2
HUM	23HUM233	Glimpses of Indian Economy and Polity	2 0 0	2
HUM	23HUM234	Health and Lifestyle	2 0 0	2
HUM	23HUM235	Indian Classics for the Twenty-first Century	2 0 0	2
HUM	23HUM236	Introduction to India Studies	2 0 0	2
HUM	23HUM237	Introduction to Sanskrit Language and Literature	2 0 0	2
HUM	23HUM238	National Service Scheme	2 0 0	2
HUM	23HUM239	Psychology for Effective Living	2 0 0	2
HUM	23HUM240	Psychology for Engineers	2 0 0	2
HUM	23HUM241	Science and Society - An Indian Perspective	2 0 0	2
HUM	23HUM242	The Message of Bhagwat Gita	2 0 0	2
HUM	23HUM243	The Message of the Upanishads	2 0 0	2
HUM	23HUM244	Understanding Science of Food and Nutrition	2 0 0	2
HUM	23HUM245	Service Learning	2 0 0	2
HUM	23JAP230	Proficiency in Japanese Language (Lower)	2 0 0	2
HUM	23JAP231	Proficiency in Japanese Language (Higher)	2 0 0	2
HUM	23SWK230	Corporate Social Responsibility	2 0 0	2
HUM	23SWK231	Workplace Mental Health	2 0 0	2

SEMESTER I
FOOD SCIENCE AND EXPERIMENTAL FOODS

Semester I
Course Code: 25FSN101
L-T-P-C 3-1-0-4

Hours of Instruction/ week – 4
No. of Credits – 4
Total 60 hrs.

Pre requisite: Basic Food Groups, cooking methods, effects of cooking

Course Objectives:

1. To impart knowledge on food groups and its nutritional composition
2. To relate the impact of cooking on the stability of nutrients.
3. To analyze the changes during processing and storage on the nutritional composition of foods.
4. To study the factors influencing the cooking quality of different foods.

Course Outcomes:

CO1: Acquire knowledge on the food groups and factors influencing the changes in different cooking methods.

CO2: Gain knowledge on nutritive value of Cereals, Pulses, Nuts and Oil Seeds, Fats, Oils and changes affecting the nutritive value during cooking methods.

CO3: Gain information on the classification and composition of fruits and vegetables

CO4: Gain insight on composition and nutritive value of meat, poultry, dairy and fish

CO5: Outline the stages of sugar, types of beverages and role of spices in cookery.

Skills:

- Develop skills on various cooking methods and medium of cooking.
- Acquire skills in processing and storage of foods.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	1	-	-	-	-	1	3	-	-	-
CO2	2	1	-	-	-	-	1	3	-	1	-
CO3	2	1	-	-	-	-	1	2	-	3	-
CO4	2	1	-	-	-	-	1	2	-	3	-
CO5	2	1	-	-	-	-	1	2	-	2	-

Syllabus:

Unit I - Introduction of Food Groups and Cooking Methods

12 hrs.

Foods, Classification, Functions, Food groups, Balanced Food, Food pyramid, My plate

Cooking- Objectives of Cooking, Preliminary preparation, cooking methods, Dry heat, Moist heat, Merits and Demerits.

Unit II - Cereals, Pulses, Nuts and Oil Seeds, Fats and Oils

12 hrs.

Structure, Composition and Nutritive Value, Changes in Nutritive Value during Cooking, cooking quality

Cereals- Cereal cookery concepts, fermented products, non-fermented products, breakfast cereals

Pulses- Factors affecting cooking quality of pulses, toxic constituents, pulse cookery.

Nuts and oil seeds- Nuts and oil seeds cookery, toxins in nuts and oil seeds

Fats & Oils – Types and classification of fats, Role of fats/oil in cookery

Unit III -Vegetables and Fruits

12hrs

Vegetables - Classification, Composition and Nutritive Value, Selection, Vegetable cookery- pigments, Changes in Nutritive Value, fungi and algae as foods

Fruits - Classification, Composition and Nutritive Value, enzymatic and non-enzymatic browning, vegetables and fruits as functional foods, Pectic substances and gel formation

Unit IV- Meat, Poultry, Dairy and Fish

12hrs.

Milk – Composition and Properties of milk, Nutritive Value, effect of heat, acid, enzymes, phenolic compounds and salts. Microorganisms, Role of milk and milk products in cookery

Egg- Structure, Composition and Nutritive Value, Quality of eggs, Egg cookery, Buying and Handling, Role of eggs in cookery.

Fleshy Foods- Structure, Composition and Nutritive value of meat, Effect of cooking on colour, Texture and flavour, Meat cookery.

Poultry - Classification, Composition and Nutritive value

Fish - Classification, Composition, Selection, Fish cookery

Unit V - Sugars, Beverages, Spices and Condiments

12hrs

Sugars - Nutritive value, Properties, Stages of sugar cookery, Sugar Related Products, Sugar Cookery and Artificial Sweetener.

Beverages - Classification, Nutritive value – Coffee, Tea, Cocoa, Chocolate, Fruit Beverages, Soups Vegetable Juices, Milk Based Beverages, Malted Beverages, Aerated and Non-Alcoholic Beverages, Miscellaneous Beverages, Alcoholic Beverages.

Spices and Condiments: Types, Functional properties, Role of spices in cookery.

Text Books:

1. Srilakshmi. B. Food Science, New Age International Pvt Ltd Publishers, 7rd Edition, 2018.
2. Shakuntala Manay, Shadaksharaswamy. M Foods, Facts and Principles, New Age International Pvt Ltd Publishers, Sixth Edition, 2015.
3. Food science, Chemistry and Experimental foods by M. Swaminathan.
4. Swaminathan, M.: Hand Book of Food Science and Experimental Food
5. Food Science and Nutrition, Sunetra Roday, 3rd edition, 2018.

Reference Books:

1. Brow, A., Understanding Food, Thomson Learning Publications, Wadsworth, 2020.
2. Mehas, K.Y. and Rodgers, S.L. Food Science and You, McMillan McGraw Company, New York, 2021.
3. Parker, R. Introduction to food Science, Delmer, Thomson Learning Co., Delma, 2019.

Evaluation Pattern:

Assessment	Internal	External
*Continuous Assessment (CA)	20	
Periodical(P1) (P2)/Mid-term	30	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

PRINCIPLES OF NUTRITION

Semester I

Course Code: 25FSN102

L-T-P –C 3-1-0-4

Hours of Instruction/ week – 4

No. of Credits – 4

Total 60 hrs.

Pre requisite: Nutrients, Sources, Functions and metabolism.

Course Objectives:

1. To build better understanding on nutrition science for health promotion and disease prevention
2. To impart knowledge on functions, metabolism, requirements and effects of deficiency of nutrients.
3. To outline the vital link between nutrition and health of individuals.

Course Outcomes:

- CO1: Understand the principles of Energy requirements, measurements, and energy metabolism in in different age group.
- CO2: Gain knowledge on the classification, composition, sources, functions, metabolism of carbohydrates, dietary fibres, and proteins.
- CO3: Understand the classification, composition, sources, functions, digestion, and absorption of Lipids and Water
- CO4: Acquire a knowledge of composition, sources, toxicity, functions, metabolism of fat and water soluble vitamins.
- CO5: Obtain knowledge on the classification, distribution in the body, functions, Source, requirements, deficiency of minerals and antioxidants.

Skills: Learn skills in developing a balanced diet based on individual requirements.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	-	-	-	1	-	1	2	1	3	-
CO2	3	-	-	-	1	-	1	3	1	3	-
CO3	3	-	-	-	1	-	1	3	1	3	-
CO4	3	-	-	-	1	-	1	3	1	3	-
CO5	3	-	-	-	1	-	1	3	1	3	-

Syllabus:

Unit I: Energy

12 hrs.

Energy, Units of Energy, Measurement of Calorific Value, Physiological fuel values, Determination of energy requirements-Direct and Indirect calorimetry, Relation between Respiratory quotient and Energy output, Specific dynamic action of foods (Diet Induced Thermo genesis) definition, determination of basal metabolism -Benedicts Roth Apparatus, Factors Affecting BMR, determination of energy metabolism during work- Energy requirements for various age groups.

Unit II: Carbohydrates and protein

12hrs.

Carbohydrates - Classification, composition, sources, functions, digestion, absorption, glycemic index and metabolism, Requirements (RDA) and deficiency. Dietary fiber – definition, sources, functions and types - Soluble and Insoluble Fiber.

Proteins - Classification, composition, sources, functions, digestion, absorption and metabolism, Requirements (RDA) and deficiency. Amino acid- classification and functions. Evaluation of protein quality-PER, NPU, NDPER, BV and Chemical score.

Unit III: Lipids and Water

12 hrs.

Lipids and fats- Classification, composition, Sources, Essential fatty acids, functions, digestion, absorption, metabolism and Requirements

Water and electrolyte Balance - Distribution of water and electrolytes, Functions, Requirements, Sources, water balance.

Unit IV: Vitamins

12 hrs.

Fat soluble vitamins - Chemistry, Functions, Sources, absorption, transport, metabolism, Requirements, Deficiency and toxicity.

Water Soluble Vitamins - Chemistry, Functions, Sources, absorption, transport and metabolism, Requirements, Deficiency and toxicity.

Unit V: Minerals and Antioxidants

12 hrs

Macro minerals - Classification, Distribution in the body, Functions, Source's, absorption, storage, metabolism, storage, requirements, deficiency and toxicity- Calcium, Phosphorus, Magnesium.

Micro minerals - Classification, Distribution in the body, Functions, Sources absorption, metabolism, storage, requirements, deficiency and toxicity- Sodium, Potassium, Copper, Iron, Zinc, Iodine and Fluorine, selenium

Antioxidants - Free radicals damage, Oxidant defense system, Antioxidants in diseases, Sources.

Text Books:

1. Srilakshmi, B., Nutrition Science, New Age International (P) Ltd., New Delhi, 8th Edition, 2023.
2. Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam, Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2015
3. Swaminathan, M., Advanced Textbook on Food and Nutrition, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore, 2015.

Reference Books:

1. Dietary Guidelines for Indians, ICMR, National Institute of Nutrition, Hyderabad, 2024.
2. Gordon M. Wardlaw, Paul M.Insel, Perspectives in nutrition 11th edition, Mosby- year Book,Inc.St.Louis,Missouri, 2019
3. Krause and Mahan's Food & the Nutrition Care Process, 16th Edition, Janice L Raymond, ISBN: 9780323810258, 2022

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD PROCESSING AND PRESERVATION –I

Semester I

Course Code:25FSN103

L-T-P – 2-2-0-4

Hours of Instruction/ week – 4

No. of Credits – 4

Total 60 hrs.

Pre- requisite: Basics of food processing & preservation methods

Course Objectives:

To discuss and apply the principles and methods involved in the processing of different food groups and the preservation methods.

Course Outcomes:

CO1: Comprehend the principles and significance of food and its processing.

CO2: Understand the principles and usage of traditional and modern processing and preservation methods.

CO3: Gain knowledge on processing and preservation of foods using chemical methods.

CO4: To learn on the importance and types of fermentation methods.

CO5: Obtain knowledge on food processing and preservation of different food products.

Compare various millet processing techniques. iii. Discuss pulse processing and preservation techniques. iv. Identify oil seed processing and preservation. v. Explain spice processing and preservation techniques.

Skills: Develop skills in various food processing techniques

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	2	1	-	-	-	1	-	2	3	2
CO2	2	2	1	-	-	-	1	-	2	3	2
CO3	2	2	1	-	-	-	1	-	2	3	2
CO4	2	2	1	-	-	-	1	-	2	3	2
CO5	2	2	1	-	-	-	1	-	2	3	2

Syllabus:

Unit I - Introduction to Food Processing and Preservation

12 hrs.

Principles, Objectives, advantages and disadvantages of food processing, advantages in food industry, significance of food preservation, Deterioration of food quality, causes of spoilage-microbial activity, enzymatic activity, insects, parasites and rodents, chemical reactions, environmental factors and time, spoilage of various foods and products

Unit II – Thermal Technology of Food Processing and Preservation

12 hrs

Objectives of different methods

Thermal technologies-pasteurization, blanching, thermal sterilization, ohmic heating, magnetic heating, microwave heating, sous-vide cooking, refrigeration, freezing, removal of moisture/water,

dehydration, lowering water activity- sun drying, air drying, superheated steam drying, solar energy and heating, vacuum drying and freeze drying.

Unit III – Thermal Technology of Food Processing and Preservation **12 hrs**

Objectives of different methods

Non-thermal technologies-Pulsed electric field, ultrasound, use of modified atmosphere, pulsed light treatment, high pressure processing, ionizing radiation, osmotic inhibition-use of salt, smoking, hurdle technology.

Unit IV –Fermented Food and Chemical Preservatives **12hrs**

Principles and importance of fermentation, types of fermentation, factors controlling fermentation, microbial culture used in food industry, fermented products

Additives, Need for additives, classification of additives-intentional additives and non-intentional additives, types of chemical preservatives

Unit V Processed and Preserved Food Products **12 hrs.**

Puffed rice, bread, soy products, types of milk products, jam, jellies, fruit juice concentrates, sauces, minimally processed fruits and vegetables, processed meat, sea food and flesh foods

Related practical experiences

1. Visit to food processing units

Text Books:

1. Shakuntala Manay, N. and Shadaksharaswamy, M., (2023) Foods – Facts and Principles, 5th Edition, New Age International (P) Limited Publishers, New Delhi, 2013.
2. G.Subbulakshmi and Shoba A Udipi Food Processing and preservation, New Age International Publishers, New Delhi, 2nd edition, 2022.
3. Sivasankar B, (2022) Food Preservation and Processing, 1st Edition, Prentice – Hall of India Private Ltd., New Delhi.
4. Modern Food Microbiology, James M.Jay, (2006), 7th Edition, CBS Publishers and Distributors, New Delhi.

Reference Books:

1. Fellow, P., Food Processing Technology (2016)– Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England.
2. Adams, M.R. and Moss, M.O., Food Microbiology, (2015) New Age International (P) Ltd., New Delhi.
3. Sommers, C.H. and Xveteng Fan, (2016) Food Irradiation Research and Technology, 2nd Edition, Blackwell Publishing, New Delhi.
4. Manual of methods of Analysis of foods, fruit and vegetable Processing, FSSAI, 2016.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD SCIENCE AND EXPERIMENTAL FOODS PRACTICAL

Semester I

Course Code:25FSN181

L-T-P – 0-0-3-1

Hours of Instruction/ week – 3

No. of Credits – 1

Total 45 hrs.

Prerequisite: Food groups, nutrients, cooking skills, cooking methods.

Course Objectives:

- To understand the fundamental principles of food science, including basics of food groups, methods of measuring ingredients, and factors influencing gluten formation and gelatinization.
- To develop essential culinary skills and techniques across a variety of food categories, including eggs, cereals, vegetables, pulses, milk, and flesh foods.
- Learn the importance of sensory evaluation in recipe formulations of sugar cookery, cereal cookery, pulse cookery, milk cookery, vegetable cookery, egg cookery, and flesh cookery.

Course Outcome:

CO1: Understand fundamental food science principles, including categorization of food groups, measuring ingredients, gluten formation, and gelatinization and improve culinary processes.

CO2: Gain proficiency in culinary techniques across a diverse food category including cooking eggs, cereals, vegetables, pulses, milk, and flesh foods.

CO3: Understand the significance of sensory evaluation and implementing during different recipe formulation.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	2	-	-	1	-	1	3	-	2	-
CO2	3	-	-	-	1	-	1	3	-	2	-
CO3	3	-	-	-	1	-	1	3	-	2	-

Skills:

Develop skills in various cooking methods involved.

Practical

45 hours

S. No	Title of Experiments	Course Outcome
Basics of Food Science		
1.	Food Groups	CO01
2.	Methods of Measuring Ingredients	CO01
3.	Determination of Edible Portion	CO01
4.	Gluten Formation	CO01

5	Factors Affecting gelatinization	CO01
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6.	Preparation of Paneer	CO01
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7.	Methods of Cooking Rice	CO01
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Experimental Cookery		
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8.	Experimental Cookery with Eggs	CO02
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9.	Experimental Cookery wit Cereals	CO02
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10.	Experimental Cookery with Vegetables	CO02
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11.	Experimental Cookery with Pulses	CO02
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12.	Experimental Cookery with Milk	CO02
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13.	Experimental Cookery on Flesh Foods	CO02
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14.	Stages of Sugar Cookery	CO02
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Recipe Formulation		
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15.	Introduction to Sensory Evaluation	CO03
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16.	Cereal Cookery	CO03
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17.	Pulse Cookery	CO03
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18.	Milk Cookery	CO03
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19.	Vegetable Cookery	CO03
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20.	Egg Cookery	CO03
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21.	Flesh Cookery	CO03
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References:

1. C Gopalan, Nutritive value of Indian foods, 2023
2. Dr M Swaminathan, Advanced textbook on food & nutrition, vol 2, 2022
3. Belle Lowe, Experimental cookery from chemical and physical standpoint, 2018
4. Norman Potter, Food Science, 2007

Evaluation Pattern:

Internal (CA)	External	Total
80	20	100

CA – Regular Lab Assessment

Objectives:

To help students obtain an ability to communicate fluently in English; to enable and enhance the students' skills in listening, speaking, reading, and writing; to impart an aesthetic sense and enhance creativity

Cos	Course Outcomes
CO 1	Demonstrate competence in the mechanics of writing
CO 2	Summarise audio and written texts to convey messages effectively
CO 3	Apply mechanics of writing and AI tools to draft academic and professional documents
CO4	Organise ideas and thoughts for clear written and oral communication
CO 5	Critically evaluate literary texts

Unit I

Mechanics of writing - Parts of speech – use of prepositions, adjectives, adverbs and determiners – word order – collocation – concord (Subject-Verb, Pronoun-Antecedent) – kinds and patterns of sentences

Unit II

Tenses - Modal auxiliaries - Reported speech - Active and Passive Voice - Phrasal Verbs - Linkers/ Discourse Markers - Question Tags

Unit III

Pre-writing techniques - Paragraph writing – Cohesion – Development – types: definition, comparison, classification, contrast, cause and effect - Essay writing: Descriptive and Narrative - Introduction to the use of Gen AI in writing (AI tools, Do's and Don'ts while using AI, how to write prompts, etc.)

Unit IV

Listening comprehension (3 pieces – Do Schools kill creativity? By Sir Ken Robinson, Steve Jobs' 2005 Stanford Commencement Address, India Questions Dr Abdul Kalam- Aired August 2007) - Reading Comprehension – Skimming and Scanning- Inference and Deduction – Reading different kinds of material – Speaking: Narration of incidents / stories/ anecdotes.

Unit V

Shashi Tharoor – “‘Kindly Adjust’ to Our English

A. G. Gardiner – “A Fellow Traveller”

Ruskin Bond – “The Eyes Have It”

Mrinal Pande – “Girls”

W. H. Auden – “Unknown Citizen”

W H Davies - “Leisure”

References:

1. Murphy, Raymond, *Murphy's English Grammar*, CUP, 2004
2. Syamala, V. *Speak English in Four Easy Steps*, Improve English Foundation Trivandrum: 2006
3. Martinet, Thomson, *A Practical English Grammar*, IV Ed. OUP, 1986.
4. The Week - June 03, 2018, LAST WORD;

<https://www.theweek.in/columns/shashi-tharoor/2018/05/25/kindly-adjust-to-our-english.html?fbclid=IwAR3IhtdXqvuV4ySECn9S7SA6HmCEYISyd1QHd3BlwKgiNKKwdkeSg3qWp-U/>

5. A G Gardiner – *Leaves in the Wind*, Digicat (e-book), 2015
6. Ruskin Bond – *The Best of Ruskin Bond*; India Penguin. April 2016.
7. Mrinal Pande – *Stepping Out*; Penguin India; 2003
8. W H Auden – *Another Time*; Random House Pub; 1940
9. William H Davies – *Songs of Joy and Others*; Andesite Press, August 2017.
10. Sir Ken Robinson – “Do schools kill creativity?”. <https://go.ted.com/6WoC>
11. Steve Jobs’ 2005 Stanford Commencement Address.
<https://youtu.be/UF8uR6Z6KLc?si=1nMNYJOk3Yw7H7tF>
12. India Questions Dr Abdul Kalam (aired: August 2007).
<https://youtu.be/erg3CmVm6M4?si=YudsxXZOFY1do91C>

Course Objectives:

- To enable the students to acquire basic skills in functional language.
- To develop independent reading skills and reading for appreciating literary works.
- Enable students to communicate in the language they have studied in a range of contexts and for a variety of purposes
- To analyse language in context to gain an understanding of vocabulary, spelling, punctuation and speech

Course outcomes:

CO1: Develop the ability to read and critically appreciate a given text

CO2: Develop fluency in speaking the language

CO3: Ability to blend language and Indian spirituality.

Unit	Topic
1	Adhyatmaramayanam , Tharopadesam(Enthinu Sokam....thulom) ----- Jnanappana (sthanamanangal....Trishnakondubhramikkunnathokkeyum)
2	Modern Poets: Mampazham-Vyloppilly Sreedharamenon Critical analysis of the poem.
3	Short stories from period 1/2/3: Poovanpazham -Vaikaom Muhammed Basheer
4	Literary Criticism: Bharatha Paryatanam - <i>Vyasante Chiri</i> —Ithihasa studies-Kuttikrishna Marar-Outline of literary Criticism in Malayalam Literature
5	Error-freeMalayalam: 1. Language; 2. Clarity of expression; 3. Punctuation-Thettillatha Malayalam – Writing- a. Expansion of ideas; b. PrecisWriting; c. Essay Writing

Text books/Reference :

1. Adhyatmaramayanam – Thunjath Ramanujan Ezhuthachan
2. Ramayanavichinthanam-Dr. A. M. Unnikrishnan
3. Thunjan Padhanangal-Prof.Panmana Ramachandran
4. Compleate Works including Jnanappana-Poonthanam
5. Vyloppilly-M.N.Vijayan
6. Vyloppilli-Vyakthi,Kavi-Dr.M.Leelavathi/S.Gupthan Nair
7. Basheerinte Poonkavanam-Prof.M.N.Karasseri
8. Basheer-Life & Works
9. Bharatha Paryatanam-Kuttikrishna Marar
10. Lavanyasastrathinte Yukthisilpam-Dr.Thomas Mathew
- 11)Thettillatha Malayalam – Prof.Panmana Ramachandran Nair(His all books on Error Free Malayalam)

Course Objective: The course will enable the students to understand the basics of grammar and usage, to appreciate the literary compositions, and to understand the intricacies of language and literature.

Course Outcomes: By the end of the course the students will be able to:

1. Distinguish various literary genres.
2. Explore tradition and culture through literature.
3. Apply the basics of grammar.
4. Critically analyse the prescribed literary texts.

UNIT 1

Hindi Sahithya ki Panch shresht Kahaniyam:

- a. Sughamay Jeevan –Chandradhar Sharma ,Guleri
- b. Dhan ki Bhent-Rabindranath Tagore
- c. Anbola –Jayashankar Prasad
- d. Swamini (Manasrovar bhagh-1) Premchand

UNIT 2.

Hindi Kavitha:

- a. 'Aarya' –Maithili Sharan Gupt
- b. "Meribhi abha he Ismein' .,"Mubarak Ho Naya Saal"-_Nagarjun
- c. "Nishaa Ki rod eta Rakesh- Nihar se'.,Shoonya Mandir meinBanoongi-Sandhya Geet se - Mahadevi varma
- d. 'KhoobLadi Mardani vahtho Jhansi Vali rani thi'-subhadra Kumari chohan

UNIT 3.

Hindi Ekanki:

- a) Mohan Rakesh :Andeke Chilke
- b) Vishnu Prabhakar :Sarkari Noukari

UNIT 4.

Grammar:1)Karak2) Upasarg3)Pratyay4)Vakya Rachana 5)Padaparichay.6)Sarvanam7)kriya 8)Adjective 9)Adverb10)Tenses

REFERENCE

1. Sugam Hindi Vyakarn, :Prof.Vanshidhar & Dharmapal Shastri
2. Vyavaharik Hindi Vyakaranantatha Rachana: Dr.Hardev Bahari
Shiksharthi HindiVyakaran:Dr. Nagappa
3. Hindi Sahithya ki Panch shresht Kahaniyam: Edited by: Dr.Sachidanandh Shuklu
(Printed and Published by V&S publishers, Abridged, AnsariGanj, Delhi)
4. Hindi Samay.com,/Hindikahani.com/exotic indiaart.com

Objectives:

- To enable the students to acquire basic skills in functional language.
- To develop independent reading skills and reading for appreciating literary works.
- Enable students to communicate in the language they have studied in a range of contexts and for a variety of purposes
- To analyse language in context to gain an understanding of vocabulary, spelling, punctuation and speech

Course Outcome

CO1	Develop the ability to read, listen and write in Kannada and to understand and use the language in a variety of contexts and situations
CO2	To enable the learners to understand the grammatical structures of classes of words
CO3	Develop ability to speak fluently and interactively in both personal and professional context

Course Contents**UNIT – 1**

Adalithadalli Kannadada balake: (Use of Kannada in business and administration)

Bhashe – swaroopa, stityantaragalu,

Aadu bhashe, pradeshika bhashe, Grantika bhashe

Paaribhaashika padagalu

UNIT – 2

Padagala rachane, deshiya – anya deshiya padagalu

Lekhana Chinnhegalu

Kannada bharavanigeya shuddha mattu ashuddha roopagalu,

Dwiruktigalu, jodunudigalu

UNIT – 3

Nudigattgalu, gaade vistarane

Listening to radio speech, tongue twister - practice

UNIT – 4

Patra Lekahna - aupacharika haagu anoupacharika

Kandikegala rachane

Prabandhagalu: vivaranaatmaka haagu niroopanatmaka

UNIT – 5**Poems**

- Vachanagalu – kaalugalembavu gaali kandaya – Allamaprabhu, Ratnada sankoleyaadade todarallve – Akkamahadevi, ole hatti uridare nilabahudallade - Basavanna
- Keerthanegalu – Tanuva nirolagaddi phalavenu – Purandaradasa, Tallanisadiru kandya taalu manave - Kanakadaasa
- Tripadigalu – Saalavanu kombaaga haalogarundante - Sarvagna
- Janapada geetegalu - Yaake badtaadi tamma

Short stories

- Sambhanda – Shrikrishna Alanahalli
- Moksha – Sethuram

Prabandhagalu

- Namma Maneya Deepa – Ha.Ma.Nayak
- Bhadrhuku Kanasalla, Ondhu Kale – N K Kulakarni

References:

1. H.S.Krishnaswamy Iyangaar – Adalitha Kannada – Chetana publication, Mysuru
2. Kannada Vyakarana mattu Rachane – N.Gopalakrishna Udupa, M.C.C.Publication
3. G.H.Naayak – Kannada Sanna Kathegalu – Chetana Book House
4. Shatamaanada Lalitha Prabandha – Gurulinga Kaapase - Karnataka Sahitya Academy
5. Naavalla – Kathasankalana – Sethuram
6. Basavannanavara Vachanagalu – G.V.Shastri – Paaruprakashana
7. Kannadada Balake – H.S.Krishnaswamy Iyangaar – Chetana book house
8. Sarvagnana Vachanagalu – Venkata Subbaiha, Vijayavaahini Publications

Course Objectives:

- To enable the students to acquire basic skills in functional language
- To develop independent reading skills and reading for appreciating literary works.
- To analyse language in context to gain an understanding of vocabulary, spelling, punctuation and speech
- Grasp the connection between Sanskrit language and Indian philosophy

Course Outcomes:

CO 1 Read and understand Sanskrit verses and sentences and communicate in Sanskrit

CO 2 Imbibe values of life and Indian tradition propounded by the scriptures

Module I

Introduction to Sanskrit language, Devanagari script - Vowels and consonants, pronunciation, classification of consonants, conjunct consonants, words – nouns and verbs, cases – introduction, numbers, Pronouns, communicating time in Sanskrit. Practical classes in spoken Sanskrit

Module II

Verbs- Singular, Dual and plural — First person, Second person, Third person.

Tenses – Past, Present and future – Atmanepadi and parasmaipadi-karthariprayoga.

Module III

General group words for communication and moral stories.

Module IV

ChanakyaNeeti chapter III (part I), Bhagavad Gita chapter 14 (part I)

Module V

Translation of simple sentences from Sanskrit to English and vice versa.

Course Objectives:

To teach Tamil for effective communication in different spheres of life: - cultural relations in society.

Course Outcomes:

1. Giving exposure to history of Tamil literature and Introduction of select Classics
2. Initiating Students to the spirit of Bhakti literature
3. Encouraging creativity of students by teaching Contemporary Literature poetry, modern poetry, Short Story, Prose, Novel, etc
4. Introduction of basic Grammar, Letter writing and essay writing skills of Tamil language.

அலகு-1

தமிழ்இலக்கியவரலாற்றில்சங்கஇலக்கியம்: முதல், இடை, கடைசங்கம்.

சங்கஇலக்கியங்கள்பத்ஃப்பாண்஁ு.

குறுந்தாடக (6,8பாடல்கள்),

புறநானூறு (184,192பாடல்கள்).

சங்கம்மநுவியகாலஇலக்கியம்:

சிலப்பதிகாரம் (வழக்குடறக்காடத),

பதிதெெ்ஃழ்கெக்குநூல்கள்,

திருக்குறள் (மருந்F)

UNIT-1 History of Tamil Literature: First, Intermediate, Last sangam. Sangam Literature, Pattuppaattu. Kuruntogai, Puranaanuru.

Literature of the Sangam Maruviya period – Silappathiagam (vazhakkurikaathai), PatiṇṇkiizhKaṇakkuNuulkaL. TirukkuraL (Marunthu)

அலகு 2

பக்திஇலக்கியம்:—

பன்னிருதிருமுடற்கள்அறிமுகம்,

மா஁்க்கவாசகர் (திருவாசகம்- சிவபுரா஁ம்)

UNIT 2 Bhakti Literature – Introduction to PanniruThirumuraikal, Manikkavasagar (Thiruvvasagam- Siva Puranam)

அலகு -3

தற்காலஇலக்கியம்:-

கவிதை : பாதியார் (சூயில்பாண்஁டு), பாரதிதாசன்

(தமிழின்இனிடம்). **உதைநதை:** ஞா.ததவதநயப்பாவார்

(தமிழும் திரவிதமும் சமமா?), பரிதிமாற்கடலஞர்

(தமிழ்தமாழியின்வரலாறு (ஆதிவரலாறு)).

சிற்பி (வள்ளுவர்வகுக்கும்இன்பம்)

சிறுகதை: அழகியதபரியவன் – (வனம்மாள்)

நாவல்: இடமயம் (தபத்தவன்)

UNIT-3 Contemporary Literature: Poetry - Bharathiar(kuyilpāṭṭu), Bharathidasan (tamiḷinimai, inṭattamiḷ) Pattukkottai Kalyanasundaram.

Prose: G. Devaneyabhavanar (TamizhumDhiravidamumsamamaa?), Paritimārkalaiñār (paranarkettaparisu), chirbi (valluvarvakukkumibam)

Short Story: Azhagiya Periyavan – (VanammaaL)

Novel: Imaiyam (Peththavan)

அலகு - 4ததால்காப்பியம்:

எழுத் F – பிறப்பியல்.

நிறுத்தக் குறிகள் மற்றும்

கடிதம்எழுதலும்கட்டுரஎழுதலும்

UNIT – 4tolkāppiyam: Alphabet – pirappiyal. Punctuation marks and Letter writing and essay writing.

REFERENCE

இடமயம், தபத்தவன், க்ரியாதவளியீடு 2019.

அழகியதபரியவன் ,அழகியதபரியவன்கடதகள், நற்றிடைபதிப்பகம், 2016
சி.பாலசுப்பிரமெயன், கைடுடர-வளம், நறுமலர்ப்பதிப்பகம், பத்தாம்பதிப்பு 1994
பரிதிமாற்கடலஞர் ,தமிழ்தமாழியின்வரலாறு, பூம்புகார்பதிப்பகம், ஆறாம்பதிப்பு 2013.
அகளங்கன், பன்னிருதிருமுடற – அறிமுகம், இந்மாமன்றம்வவுனியா, 1994
ரா. சீனிவாசன் ,தமிழிலக்கியவரலாறு ,<https://ta.wikisource.org/s/99uk>
மாடுிக்கவாசகர் (திருவாசகம்- சிவபுராண்ம்
தபான்மெமாறன் “அதாதாந்தமிழிலக்கெம் “அதாதான்பப்ளிஷிங்குருப், வஞ்சியூர்,
திருவனந்தபுரம், 2007.
<http://www.tamilvu.org/libirary/libindex.htm>.
http://www.gunathamizh.com/2013/07/blog0post_24.html

Objectives:

- To expose students to various genres of English literature
- To expose the students to Indian English Writing of different timelines.
- To develop a sensibility to read and understand literary works.
- To introduce a few linguistic devices to enable them to appreciate literary forms stylistically

COs	Course Outcomes
CO 1	Identify and distinguish various genres of English Literature for better understanding
CO 2	Demonstrate an ability to comprehend and analyse literature independently
CO 3	Develop or enhance the ability to appreciate and use linguistic devices for stylistic analysis

Unit-I

Introduction to Literature – Nature & Elements of Literature, literature as an expression of personal & historic aspects. Narrative structure & technique. Introduction to Indian Literature: Pre-independence, postindependence, themes, writers, and problems.

Unit-II

Linguistic Devices: Theme, Diction, syntax & syntactical deviations, Rhetorical devices, figures of speech

Unit-III**Poetry:**

The Frog and the Nightingale by Vikram Seth

An Indian Love Song by Sarojini Naidu

Death of the Wolf by Toru Dutt

Unit IV**Short stories:****Detail-**

A Dog's Life by Mulk Raj Anand

Interpreter of Maladies by Jhumpa Lahiri

Unit-V**Non-Detail Reading:**

Three Persons by Vijay Sheshadri

The Wolf's Postscript To 'Little Red Riding Hood' by Agha Shahid Ali

The Naive Friends by Premchand

The Woman on Platform 8 by Ruskin Bond

Core Reading :

- Iyengar, Srinivasa – *The Indian Contribution to English Literature*. Karnatak Publishing House, Bombay, 1945
- Iyengar, Srinivasa – *Indian Writing in English : 1800-1980* – Sterling Publishing House, 2019

References

- Seth, Vikram, *Beastly Tales*, Penguin India, 2013
- Naidu, Sarojini, *The Golden Threshold* 1905
- Dutt, Toru - *A Sheaf Gleaned in French Fields* 1876
- Anand, Raj Mulk, *Selected Short Stories* Penguin India, 2006
- Tagore, Rabindranath, *Mashi and Other Stories*, True Sign Publishing House, 2021
- Lahiri, Jhumpa - *Interpreter of Maladies* Harpercollins Publishers India, 2005
- Sheshadri, Vijay – POETRY Magazine, December 2010
- Ali, Shahid Agha, *The Wolf's Postscript To 'Little Red Riding Hood'* Academy of American Poets, poets.org

- Premchand - , Mindfuel's 4 In 1 Story By Munshi Premchand - Power Of A Curse, The Naive Friends, A Complex Problem & A Lesson In The Holy Life Mindfuel Publishers, 2020
-
- Bond, Ruskin - *The Woman on Platform 8*, The Illustrated Weekly of India

Evaluation Pattern:

Assessment Component	Weightage
Continuous Evaluation (Class Tests, Assignment, Class Activity)	20
Mid Term Examination	30
End Semester Examination	50
Total	100

Course Objective(s)

To introduce students to the depths and richness of the Indian culture and knowledge traditions, and to enable them to obtain a synoptic view of the grandiose achievements of India in diverse fields. To equip students with knowledge of their country and its eternal values.

Course Outcomes

COs	Description
CO1	Increase student understanding of true essence of India's cultural and spiritual heritage.
CO2	Emancipating Indian histories and practices from manipulation, misunderstandings and other ideological baggage thus, shows its contemporary relevance.
CO3	Understand the ethical and political strategic concepts to induce critical approach to various theories about India.
CO4	Familiarize students with the multi dimension of man's interaction with nature, fellow beings and society in general.
CO5	Appreciate the socio-political and strategic innovations based on Indian knowledge systems. Gives an understanding of bringing Indian teaching into practical life.

CO-PO Mapping

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO															
CO1	-	-	-	-	-	-	2	2	-	-	-	3	-	-	-
CO2	-	-	-	-	-	-	1	2	-	-	-	3	-	-	-
CO3	2	-	-	-	-	2	3	3	-	-	-	-	-	-	-
CO4	-	-	3	-	3	2	3	-	-	-	-	3	-	-	-
CO5	2	-	1	2	-	1	3	1	-	-	-	2	-	-	-

Syllabus

- Chapter 1 - Educational Heritage of Ancient India
- Chapter 2 - Life and Happiness
- Chapter 3 - Impact of Colonialism and Decolonization
- Chapter 4- A timeline of Early Indian Subcontinent
- Chapter 5 - Indian approach towards life
- Chapter 6 - Circle of Life
- Chapter 7- Pinnacle of Selflessness and ultimate freedom
- Chapter 8- Ocean of love; Indian Mahatmas.
- Chapter 9 - Become A Strategic Thinker (Games / Indic activity)
- Chapter 10 - Man's association with Nature
- Chapter 11 - Celebrating life 24/7
- Chapter 12 - Metaphors and Tropes
- Chapter 13 - India: In the Views of foreign Scholars and Travellers.

Self-Study/ Self-reading

- Chapter 14 - Personality Development Through Yoga.
- Chapter 15 - Hallmark of Indian Traditions: Advaita Vedanta, Theory of oneness
- Chapter 16 - Conversations on Compassion with Amma

Textbooks/References

- 1. Foundations of Indian Heritage

Evaluation Pattern

Assessment	Weightage (%)
Midterm	30
Continuous Assessment	20
End Semester Exam	50
Total Marks	100

1. Course Overview

Master Over the Mind (MAOM) is an Amrita initiative to implement schemes and organise university-wide programs to enhance health and wellbeing of all faculty, staff, and students (UN SDG -3). This program as part of our efforts for sustainable stress reduction gives an introduction to immediate and long-term benefits and equips every attendee to manage stressful emotions and anxiety facilitating inner peace and harmony.

With a meditation technique offered by Amrita Chancellor and world-renowned humanitarian and spiritual leader, Sri Mata Amritanandamayi Devi (Amma), this course has been planned to be offered to all students of all campuses of AMRITA, starting off with all first years, wherein one hour per week is completely dedicated for guided practical meditation session and one hour on the theory aspects of MAOM. The theory section comprises lecture hours within a structured syllabus and will include invited guest lecture series from eminent personalities from diverse fields of excellence. This course will enhance the understanding of experiential learning based on university's mission: "Education for Life along with Education for Living", and is aimed to allow learners to realize and rediscover the infinite potential of one's true Being and the fulfilment of life's goals.

2. Course Syllabus

Unit 1 (4 hours)

Causes of Stress: The problem of not being relaxed. Need for meditation -basics of stress management at home and workplace. Traditions and Culture. Principles of meditation– promote a sense of control and autonomy in the Universal Human Value System. Different stages of Meditation. Various Meditation Models. Various practices of Meditation techniques in different schools of philosophy and Indian Knowledge System.

Unit 2 (4 hours)

Improving work and study performance. Meditation in daily life. Cultivating compassion and good mental health with an attitude of openness and acceptance. Research and Science of Meditation: Significance of practising meditation and perspectives from diverse fields like science, medicine, technology. philosophy, culture, arts, management, sports, economics, healthcare, environment etc. The role of meditation for stress and anxiety reduction in one's life with insights based on recent cutting-edge technology. The effect of practicing meditation for the wholesome wellbeing of an individual.

Unit 3 (4 hours)

Communications: principles of conscious communication. Relationships and empathy: meditative approach in managing and maintaining better relationships in life during the interactions in the world, role of MAOM in developing compassion, empathy and responsibility, instilling interest, and orientation to humanitarian projects as a key to harness intelligence and compassion in youth. Methodologies to evaluate effective awareness and relaxation gained from meditation. Evaluating the global transformation through meditation by instilling human values which leads to service learning and compassion driven research.

TEXT BOOKS:

- 1.Mata Amritanandamayi Devi, "Cultivating Strength and vitality," published by Mata Amritanandamayi Math, Dec 2019
- 2.Swami Amritaswarupananda Puri , "The Color of Rainbow " published by MAM, Amritapuri.

REFERENCES:

- 1.Craig Groeschel, "Winning the War in Your Mind: Change Your Thinking, Change Your Life" Zondervan Publishers, February 2019
- 2.R Nagarathna et al, "New Perspectives in Stress Management "Swami Vivekananda Yoga Prakashana

publications, Jan 1986

3. Swami Amritaswarupananda Puri “Awaken Children Vol 1, 5 and 7 - Dialogues with Amma on Meditation”, August 2019
4. Swami Amritaswarupananda Puri “From Amma’s Heart - Amma’s answer to questions raised during world tours” March 2018
5. Secret of Inner Peace- Swami Ramakrishnananda Puri, Amrita Books, Jan 2018.
6. Mata Amritanandamayi Devi “Compassion :The only way to Peace:Paris Speech”, MA Center, April 2016.
7. Mata Amritanandamayi Devi “Understanding and collaboration between Religions”, MA Center, April 2016.
8. Mata Amritanandamayi Devi “Awakening of Universal Motherhood: Geneva Speech” M A center, April 2016.

3. Evaluation and Grading

Internal			External	Total
Components	Weightage		Practical (attendance and class participation) 60%	100%
Quizzes(based on the reading material)	20%	40%		
Assignments (Based on webinars and lecture series)	20%			

4. Course Outcomes (CO)

CO1: Relate to the causes of stress in one’s life.

CO2: Experiment with a range of relaxation techniques CO3: Model a meditative approach to work, study, and life.

CO4: Develop appropriate practice of MA-OM technique that is effective in one’s life CO5: Inculcate a higher level of awareness and focus.

CO6: Evaluate the impact of a meditation technique

***Programme Outcomes(PO)**(As given by NBA and ABET)

PO1: Engineering Knowledge

PO2: Problem Analysis

PO3: Design/Development of Solutions

PO4: Conduct Investigations of complex problems

PO5: Modern tools usage

PO6: Engineer and Society

PO7: Environment and Sustainability

PO8: Ethics

PO9: Individual & Team work

PO10: Communication

PO11: Project management & Finance

PO12: Lifelong learning

CO – PO Affinity Map

PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
CO															
CO1	3	3	3	2		-	2	3	-	3	-	3	-	-	-
CO2	3	3	3	2	2	—	2	3	3	3	-	3	-	-	-
CO3	3	3	2	2	2	2	2	3	3	3	-	3	-	-	-
CO4	3	3	3	2	-	2	3	3	3	3	-	3	-	-	-
CO5	3	2	2	2	-	2	-	3	2	2	-	2	-	-	-
CO6	3	2	2	2	3	2	—	3	2	2	-	2	-	-	-

SEMESTER II
NUTRITION THROUGH LIFESPAN

Semester II
Course Code: 25FSN111
L-T-P – 3-1-0-4

Hours of Instruction/ week – 4
No. of Credits – 4
Total 60 hrs.

Pre-requisite: Growth, Development, Demand for nutrition, Different stages of life

Course Objective:

This course will give you an on insight how nutrient needs vary during the lifespan - nutrition during preconception, pregnancy and lactation, infant nutrition, childhood and adolescent nutrition, as well as adult and older adult nutrition.

Course Outcomes:

CO 1: Apply the knowledge of basics of balanced diet, significance of RDA and its purpose.

CO 2: Understand the metabolic changes and nutritional requirements during pregnancy and lactation.

CO 3: Comprehend the knowledge on infant growth development and nutritional requirements, government schemes and policies.

CO4: Gain knowledge on physiological development, nutritional recommended allowances, dietary pattern of childhood and adolescents.

CO5: Understand the physiological changes and diet modifications during adulthood and elderly population.

Skills: To provide wide knowledge and develop skill in planning the nutritional needs of all age groups by understanding their growth and development, requirements and nutritional problems.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	1	-	1	2	-	2	1	2	-	1
CO2	3	2	-	1	2	-	2	2	2	-	1
CO3	3	2	-	1	2	-	2	2	2	-	1
CO4	3	2	-	1	2	-	2	2	2	-	1
CO5	3	2	-	1	2	-	2	2	2	-	1

Syllabus:

Unit I: Introduction to RDA and Balanced Diet

12 hrs.

Basics for Recommending the Dietary Allowances, Acceptable Dietary Intake, Purposes of RDA, Factors Affecting Recommended Dietary Allowances, Requirements and Recommended Dietary Allowances, Growth chart, Uses of ICMR RDA in planning balanced diet, Consumption Units. Reference Man and Woman, Food and Nutritional Requirements for Adults doing Different Activities.

Unit II: Maternal Nutrition

12 hrs.

Nutrition in Pregnancy: Maternal nutrition and outcome, Importance of pre and periconceptional nutrition during pregnancy; Pre pregnancy weight and fetal outcome. Fetal weight gain. Nutritional assessment and guidance in prenatal care. - Physiological changes during pregnancy, expansion in blood volume, hormonal profile in pregnancy, organ functions, placental transfer of nutrients and resulting complications in pregnancy. Other nutrition related conditions; pregnancy in obese women, gestational diabetes, preeclampsia, alcohol and caffeine abuse. - Maternal nutrient metabolism and recommended intakes in pregnancy. Maternal weight gain

in pregnancy. Intrauterine growth retardation. High risk pregnancies and common concerns during pregnancy. Importance of antenatal care.

Nutrition in Lactation: Nutritional needs for lactation. Breast feeding biology, Psycho - physiological aspects of lactation. Factors affecting lactation capacity. Management of lactation, exclusive breast feeding, Breast support and counseling. Effect of breast feeding on maternal health.

Unit III: Nutrition for Infant

12 hrs.

Infant growth and physiological development. Norms/standards for growth. Growth monitoring and promotion. Failure to thrive. Infant nutritional needs and concerns. Nutrition and brain development. Infant feeding, volume and composition of breast milk, human milk Vs. artificial formula. -Development and nutritional quality of infant food: Modern infant formula, complementary and supplementary feeding. Dietary management issues in infant feeding. Food allergies in infancy. -Preterm and LBW infants: Consequences, implications for feeding and management. Neonatal infant mortality and child mortality, IMR. Government policies, schemes and entitlements.

Unit IV: Nutrition in Childhood and Adolescence

12 hrs

Childhood: Growth and development, physiological development. Nutritional needs and feeding for preschool children. Micronutrient malnutrition among preschool children. Child health, morbidity, mortality and under five mortality rate (U5MR). -Nutritional requirements and RDA. Feeding school children, behavioral characteristics and feeding problems. Dietary patterns, planning a school lunch, factors to be considered. Implications of childhood obesity and other nutritional concerns. Healthy food choices during childhood.

Adolescence: Growth during adolescence, nutritional requirements, hormonal influences, age of menarche-factors affecting, physiological problems and nutritional issues in adolescence. Government policies, schemes and entitlements

Unit V: Nutrition for Adulthood and Old age

12 hrs.

Nutritional requirements for adult man and woman. Nutritional concerns and diet. Nutrition and work efficiency. -Physiological changes in aging, effects of aging on nutritional health of elderly. RDA, nutritional guidelines. Modification in diet, feeding old people. Nutritional concerns in old age and their management. Government policies, schemes and entitlements

Reference Textbooks:

1. Srilakshmi, N., 9th Edition, Dietetics, New Age International Private Ltd., New Delhi, 2023.
2. Krause and Mahan's Food and the Nutrition Care Process, 16th Edition, Janice L Raymond & Kelly Morrow, 2023.
3. Chernoff R. Geriatric Nutrition, The Health professionals Hand book.4th Edition, Jones and Bartlett Learning, Burlington. 2013.
4. Edelstein S and Sharlin J. Life Cycle Nutrition: An Evidence Based Approach, Jones and Barlett publishers, USA. 2009.
5. Ghai OP. Essential Pediatrics, 2ndedn, Interprint, New Delhi. 1990.
6. John EM and David RT. Geriatric Nutrition. CRC Press. Taylor & Francis group. Boca Raton. 2007.
7. Kathleen ML and Escott S. Krause's Food, Nutrition and Diet Therapy, 16thedn, W.B. Saunders Company Pennsylvania. 2024.
8. Mahtab S. Bamji, Kamala Krishna Swamy and G N V Brahman. Text book of Human Nutrition. Oxford and IBH Publishing, New Delhi. 2009.

Suggested Readings:

Park K. Text Book of Preventive and Social Medicine. 21stedn, Banarsidas Bhanot Publishers, Jabalpur, India. 2011.

1. Shills ME, Olson JA, Moshe S and Ross CA. Modern Nutrition in Health and Disease, 9 thedn, Lippincott Williams and Wilkins. 2006.
2. Seth V and Singh K. Diet planning through life cycle: Part 1. Elite publishing house pvt ltd, New Delhi. 2006.
3. Smolin and Grosvenor. Nutrition Science and Applications, 3rdedn, Saunders College Publishing, Philadelphia. 2000.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

HUMAN PHYSIOLOGY

Semester: II
Course Code:25FSN112
L-T-P – 3-0-1-4

Hours of Instruction/ week – 4
No. of Credits – 4
Total 60 hrs.

Pre-requisite: Basic biology, Human body, Organs and systems, functions.

Course Objectives:

To provide keen knowledge on physiological concepts of homeostasis and control mechanisms and to study the anatomy and physiology of body systems. The course also provides practical sessions and tutorials.

Course Outcomes:

CO1: Understand the Composition and Functions of blood, heart and mechanism of circulatory system.

CO2: Comprehend the structure and functions of respiratory systems and excretory system.

CO3: Understand the anatomy and physiological metabolism of the digestive and musculoskeletal system.

CO4: Gain the knowledge on anatomy and physiology of endocrine and reproductive systems of male and female.

CO5: Gain fundamentals on structure and functions of nervous system and sense organs.

Skills: Develop skills to assess physical and clinical symptoms based on the physiological changes

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	-	-	1	-	-	2	2	1	2	-
CO2	2	-	-	1	-	-	2	2	1	2	-
CO3	2	-	-	1	-	-	2	2	1	2	-
CO4	2	-	-	1	-	-	2	2	1	2	-
CO5	2	-	-	1	-	-	2	2	1	2	-

Syllabus:

Unit I -Blood, Heart and Circulation

11 hrs.

Blood - Composition, functions, RBC – Structure, functions, erythropoiesis, Haemoglobin, WBC – Structure, functions, Classification.

Blood Platelets - Structure, functions, Reticulo endothelia system, Blood groups – Rh factor. Blood coagulation, spleen –Structure and functions, Lymph and Lymphatic system.

Heart and Circulation - Heart – Anatomy and physiology, Blood vessels –Structure of artery, vein, capillaries, Cardiac output, Arterial Blood pressure, clinical measurement of blood pressure, properties of cardiac muscle, origin and conduction of heart beat, cardiac cycle, Regulation of the Heart's action.

Unit II - Respiratory and Excretory System

11 hrs.

Respiratory System - Structure of respiratory organs, Mechanics of respiration, subdivisions of lung air, Chemistry of respiration. Artificial respiration, control of respiration, oxygen saturation, pulsoximeter.

Excretory System - Structure of Excretory System. Kidney, Nephrons, Urine Formation Composition of Urine, Micturition.

Unit III - Digestive System and Musculoskeletal System

11 hrs.

Digestive System - General anatomy of digestive system – Digestive in the mouth, stomach and intestines. Movements of small intestine. Role of pancreas, Liver – Structure and function.

Musculoskeletal System: General Anatomy of Muscular system- Functions of muscles, Ligaments, Tissues, Skeletal system, Bones and Joints

Unit – IV - Endocrine and Reproductive system

11 hrs.

Endocrinology - Structure and functions of thyroid, pituitary, parathyroid, adrenals, islets of Langerhans of pancreas, sex glands.

Reproductive System - Anatomy of Male and Female Reproductive Organs, Physiology of Menstruation, Pregnancy and Associated Changes, Placenta, mammary Gland and Lactation- Structure, lactation and process of reproduction, fertilization, development of embryo, pregnancy and parturition.

Unit V - Nervous System and Sense Organs

11 hrs.

Nervous System:

Spinal cord - Structure and functions. Ascending and descending tracts, reflex action.

Brain - Structure and functions of cerebrum, optic thalamus, midbrain, pons medulla oblongata, Hypo thalamus, cerebellum.

Autonomic nervous system, sympathetic and parasympathetic.

Special Senses.

Eye - Physiology of vision, Structure of eye, dark and light adaptation, accommodation of the eye, visual fields, common problems due to abnormalities – presbyopia, cataract, Astigmatism, Blindness.

Ear – Structure and Physiology.

Nose- Structure and Physiology

Tongue Structure and Physiology.

Demonstration

5 hrs

1. Bleeding time
2. Clotting time
3. Identification of tissues
4. Blood groups – identification
5. Measurement of Hemoglobin
6. Measuring Pulse Rate
7. Measuring Blood Pressure
8. Measurement of height, weight and calculation of BMI
9. Physical fitness test

Text Books:

1. Chatterjee C.C (2016), Human Physiology 11th Edition, Medical Allied Agency, Kolkata
2. Sembulingam, K. (2012) Essentials of Medical Physiology, 6th Edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
3. Sathya Narayana, Essentials of Biochemistry (2000)
4. Saratha Subramanian, Text of Human Physiology (2000).
5. Stuart Ira Fox, Human Physiology (2015)

Reference Books:

1. Best and Taylor, (2011) 13th Edition The Physiological Basis of Medical Practice, Saunders Company.
2. Chaudhri, K. (2016) 7th Edition Concise Medical Physiology, New Central Book Agency (Parental) Ltd., Calcutta.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD PROCESSING AND PRESERVATION –II

Semester II

Course Code: 25FSN113

L-T-P – 3-1-0-4

Hours of Instruction/ week – 4

No. of Credits – 4

Total 60 hrs.

Pre-Requisite: Techniques involved in food processing and preservation

Course Objectives:

1. To give better understanding on the importance of food preservation.
2. To relate between different types of food spoilage
3. To apply the use of different temperatures in food processing
4. To compare the preservation of various foods using sugar, chemicals and salt
5. To offer knowledge on the principles and concept of food fermentation

Course Outcomes:

- CO1: Understand the basic principles and importance of food processing preservation.
- CO2: Gain knowledge on food processing and preservation methods using high temperature.
- CO3: Comprehend learning on methods of food preservation using irradiation and advantages of microwave heating.
- CO4: Gain better understanding on food preservation using low temperature methods.
- CO5: Acquire knowledge on the food processing and conversion operations.

Skills:

1. Develop skills in food preservation
2. Develop new products with minimal processing for better retention of essential nutrients

CO PO Mappings:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	-	-	-	1	1	-	2	-
CO2	2	2	1	-	-	-	1	1	-	2	-
CO3	2	2	2	-	-	-	1	1	-	2	-
CO4	2	2	2	-	-	-	1	1	-	2	-
CO5	2	2	1	-	-	-	1	1	-	2	-

Syllabus:

Unit I - Introduction to High and Low temperature Food Processing and Preservation 12hrs.

Definition of food processing, principles and significance of high temperature preservation, factors affecting thermal death time, principles and types of spoilage, commercial heat preservation method.

Unit II – Food Processing and Preservation using Evaporation and dehydration 12hrs.

Principles of drying, types of evaporation, methods of drying, effect of dehydration, factors affecting drying, operation of evaporation process and changes during drying.

Unit III - Preservation by Irradiation and Microwave Heating 12hrs

Units of radiation, mechanism of action of radiation, effects on foods, effect on micro-organism, irradiation process, mechanism of microwave heating, advantages and its applications.

Unit IV – Food Processing and Preservation by Using Low Temperature**12hrs**

Different low temperature methods, microbial activity at low temperature, refrigeration and cooling methods, freezing and frozen storage, packaging requirements, hazard analysis, thaw indicators.

Unit V – Food Processing and Conversion Techniques**12hrs**

Size reduction, mixing, emulsification, filtration, membrane filtration, centrifugation, expression, crystallization, heat processing.

Industrial Visit

Related practical experiences

1. Visit to food processing units

Text Books:

5. Shakuntala Manay, N. and Shadaksharaswamy, M., (2023) Foods – Facts and Principles, 5th Edition, New Age International (P) Limited Publishers, New Delhi, 2013.
6. G.Subbulakshmi and Shoba A Udipi Food Processing and preservation, New Age International Publishers, New Delhi, 2nd edition, 2022.
7. Sivasankar B, (2022) Food Preservation and Processing, 1st Edition, Prentice – Hall of India Private Ltd., New Delhi.
8. Modern Food Microbiology, James M.Jay, (2006), 7th Edition, CBS Publishers and Distributors, New Delhi.

Reference Books:

5. Fellow, P., Food Processing Technology (2016)– Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England.
6. Adams, M.R. and Moss, M.O., Food Microbiology, (2015) New Age International (P) Ltd., New Delhi.
7. Sommers, C.H. and Xveteng Fan, (2016) Food Irradiation Research and Technology, 2nd Edition, Blackwell Publishing, New Delhi.
8. Manual of methods of Analysis of foods, fruit and vegetable Processing, FSSAI, 2016.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD CHEMISTRY

Semester II
Course Code: 25FSN114
L-T-P –3-0-0-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs.

Pre requisite: Basics of chemistry - water, carbohydrates, proteins and fats.

Course objective:

To provide a deeper knowledge on the chemical constituents, their stability, changes - in different medium and their applications

Course outcomes:

CO1: Gain clear understanding of the interaction of water with food and the role of water in food

CO2: Understand the chemistry of sugars and starch and their contribution in the foods

CO3: Gain knowledge on the types of proteins, properties and the action of chemicals on it.

CO4: Recognize the characteristics of fats and oils

CO5: Familiarize with the pigments in food, spices and condiments, enzymes additives and toxic substances.

Skills: Develop skills in the chemistry behind foods during processing

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	1	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-
CO3	-	1	-	-	-	-	-	-	-	-	-
CO4	-	1	-	-	-	-	-	-	-	-	-
CO5	1	1	-	-	-	-	-	-	-	-	-

Syllabus:

Unit I: Sols, Gels and Solutions

9 hrs

Moisture in Foods, Hydrogen Bonding, Bound Water, Water and its interaction with food components and food stability, Water Activity in Foods, Determination of Moisture Content in Foods, True Solutions, Dispersions, and colloidal solutions.

Unit II: Carbohydrates- Chemical properties for Food Applications

9 hrs

Carbohydrates- Starch - granule structure and properties, native and modified Heteropolysaccharides - pectic substances and seed gums, Sweeteners, Effect of Sugar, Acid, Alkali, Fat and Surface- Active Agents on Starch, Chemistry of Milk Sugar, Non Enzymatic Browning, Swelling of Starch Granules, Gel Formation, Retrogradation, Syneresis.

Unit III: Proteins- Chemical properties for Food Applications

9 hrs

Proteins - Amino acid chemistry, Protein structure, Components of Wheat Proteins, Structure, Gluten Formation Effect of Soaking, Fermentation and Germination on Pulse Proteins. Properties of Egg Protein, Chemistry of Milk Protein, Changes in Milk, Egg and Meat Proteins during Heating, Action of Heat, Acid, Alkalis on vegetable Proteins and animal Proteins.

Unit IV: Fats and Oils- Chemical properties for Food Applications

9 hrs

Lipids - Fatty acids and triglycerides, Phospholipids, Physical and Chemical Properties of Fats and Oils, Lipid oxidation -Rancidity, hydrolytic and oxidative Hydrogenation - mechanisms and catalysts, Winterization, Decomposition of Triglycerides, Shortening Power of Fats, Changes in Fats and Oils during Heating, Factors affecting fat absorption in foods

Unit V: Chemistry of Pectic Substances, Plant Pigments, Spices and condiments 9 hrs

Pectins, Phenolic Components, Enzymatic Browning in Fruits and Vegetables, Volatile Compounds from Cooked Vegetables, Different Types of Plant Pigments – Water- and Fat-Soluble Pigments, Properties and Active Principles of Spices and Condiments, Colours and colorants, Food additives, Flavours, Acid -base chemistry of foods and common additives, Toxicsubstances.

Textbooks

1. Shakuntala Manay, Shadaksharaswamy. M (2017) Foods, Facts and Principles, New Age International Pvt Ltd Publishers, 2nd Edition
2. Chandrasekhar, U. Food Science and applications in Indian Cookery (2002) Phoenix Publishing House, New Delhi.
3. Swaminathan, M. Food Science, (2015) Chemistry and Experimental Foods, Bappco Publishers, Bangalore

References

1. Meyer, L.H, Food Chemistry, (2004) CBS Publishers and Distributors, 4th edition
2. Paul, P.C. and Palmer, H.H. Food Theory and Applications (2000) John Wiley and Sons, New York, (Revised Edition)
3. Chopra H.K, Panesar, P.S, Food Chemistry (2010) Narosa Publishing House, New Delhi
4. “Fennema’s Food Chemistry “4th ed. Damodaran, Parkin & Fennema (2008), CRC Press, Boca Raton, USA

Evaluation pattern

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

NUTRITION THROUGH LIFESPAN PRACTICAL

Semester II

Course Code: 25FSN182

L-T-P – 0-0-3-1

Hours of Instruction/ week – 3

No. of Credits – 1

Total 45 hrs.

Pre requisite: Stages of Human development, Food & Nutritional Requirements

Course Objectives:

1. To relate foods and nutrients to the biological requirements of humans at different stages of the life cycle.
2. To describe nutrition-related concerns specific to each stage of the human life cycle to consequences for health and disease.
3. Relate the role of a dietitian in diet planning and home maker in family meal planning

Course Outcomes:

1. Apply knowledge on the skills in planning balanced diet for all age groups.
2. Apply knowledge on the skills in planning balanced diet for special population like pregnancy, lactation and old age.

Skills: Develop skills in planning and evaluating menu plans throughout different stages of life span

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	-	1	-	1	3	1	2	1
CO2	2	3	-	-	1	-	1	3	1	2	1

Practical:

45hrs.

	NUTRITION DURING INFANCY, CHILDHOOD AND ADOLESCENCE
1	Formulation and preparation of weaning food
2	Menu for a preschool Child (1-3years)
3	Menu for a school going child (4-6 years)
4	Menu for an Adolescent girl (10-12 years)
5	Menu for an Adolescent boy (13-15 years)
6	Menu for an adolescent boy (16-18 years)
7	Menu for an Adolescent girl (16-18 years)
	NUTRITION DURING ADULT, OLD AGE AND SPECIAL CONDITION
8	Menu plan for adult man doing moderate work
9	Menu plan for adult man doing sedentary work
10	Menu plan for adult man doing heavy work
11	Menu plan for adult woman doing moderate work
12	Menu plan for pregnant woman doing sedentary work
13	Menu plan for lactating woman doing heavy work
14	Menu plan for a old age man doing sedentary work
15	Menu for an old age woman doing sedentary work

Reference books:

1. Dietary Guidelines for Indians, ICMR, National Institute of Nutrition, Hyderabad, 2024.
2. Gopalan, C. Rama Sastri B.V. and Balasubramanian, Nutritive Value of Indian Foods, NIN, ICMR, Hyderabad, 2017.
3. Srilakshmi, B., Dietetics, New Age International (P) Ltd., New Delhi, 9th edition, 2023.
4. Swaminathan, M., Advanced Textbook on Food and Nutrition, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore, 2012.

Evaluation Pattern:

Internal	External	Total
80	20	100

*CA – Regular Lab work assessment

FOOD PROCESSING AND PRESERVATION PRACTICAL

Semester II

Course Code: 25FSN183

L-T-P – 0-0-3-1

Hours of Instruction/ week – 3

No. of Credits – 1

Total 45 hrs.

Pre requisite: Food preservation, cooking methods

Course Objectives:

1. To understand the fundamentals of food preservation and processing methods, emphasizing the importance of food safety and quality.
2. To explore the principles and techniques of sugar preservation methods and their applications in extending shelf life.
3. To examine the principles and applications of salt preservation methods and their effectiveness in maintaining food quality and safety.

Course Outcome:

CO1: Demonstrate a comprehensive understanding of the fundamental concepts of food preservation and processing methods, with a keen emphasis on ensuring food safety and quality

CO2: Apply the principles and techniques of sugar preservation methods and prolong the shelf life of various food products.

CO3: Evaluate the principles and applications of salt preservation methods and assess their efficacy in preserving food quality and safety standards.

Skills:

Develop food processing and preservation skills for product development.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO01	2	2	-	-	1	-	2	2	2	2	-
CO02	2	2	-	1	1	-	2	2	2	2	-
CO03	2	2	-	-	1	-	2	-	2	-	-

Practical**45hrs.**

S. No	Title of Experiments	Course Outcome
Introduction to Food Preservation & processing methods		
1	Specification suggested by FSSAI – Specification of fruit beverage	CO01
2	Preservation by different Drying Methods	CO01
3	Processing by different Blanching Methods	CO01
4	Preservation by different Cold treatment methods	CO01
Sugar Preservation Methods		
5	Preservation of Jam	CO02
6	Preparation of Jelly	CO02
7	Preparation of Squash	CO02
8	Preparation of RTS beverages	CO02
9	Preparation of Candies & Fruit Lether bar	CO02
Salt Preservation Methods		
10	Preparation of Ketchup & Sauce	CO03
11	Preparation of Vadam & Vathal	CO03
12	Preparation of Pickles	CO03

Textbooks:

1. Srivastava R.P. Fruit and vegetable preservation – Principles and Practices, International Book Distributing Co., (IBDC), New Delhi.2013

References:

1. Maria Parloa (2012), Canned fruit, preserves and jellies: Household methods of preparation, Published by US department of Agriculture, Washington.
2. M. Shafiur, Rahman (2017), Handbook of food preservation 2 nd Edition, CRC press, USA.

Evaluation Pattern:

Internal (CA)	External	Total
80	20	100

CA – Regular Lab Work Assessment

FOOD CHEMISTRY PRACTICAL

Semester II
Course Code: 25FSN184
L-T-P – 0-0-3-1

Hours of Instruction/ week – 3
No. of Credits – 1
Total 45 hrs.

Pre-requisite: Chemistry behind foods, Effects of cooking, changes during cooking

Course Objectives:

1. To enable the students to Study the physio-chemical changes that occur in foods during cooking.
2. To Gain knowledge about the chemistry underlying the properties and reactions of various food components.
3. To Understand the various properties exhibited by starch and sugars, proteins, fats and oils , pectic substances and spices and condiments

Course Outcomes:

CO1: Demonstrate proficiency in understanding physiochemical changes occurring in foods during cooking.

CO2: Describe the basic principles and properties of starch proteins, fats and oils, pectic substances and spices and condiments.

CO3: Gain sufficient knowledge about chemistry of starch proteins, fats and oils, pectic substances.

Skills: Develop products with minimum nutritional loss based on the knowledge of food chemistry.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	-	-	3	-	1	-	-	2	-
CO2	2	1	-	-	3	-	1	-	-	2	-
CO3	2	1	-	-	3	-	1	-	-	2	-

Practicals:

45hrs.

1. Dispersion, Colloids, Emulsions, Sols, Gels, etc
2. Microscopic Examination of uncooked and gelatinized Starch
3. Enzymatic Browning & Non Enzymatic Browning
4. Retrogradation and Syneresis
5. Scum formation
6. Boiling over and scorching of milk
7. Effect of Soaking, germination and fermentation of Pulses
8. Over boiling of Eggs and formation of Hydrogen sulphide
9. Mayonnaise -Emulsion
10. Smoking Temperature of Different Fats, Factors Affecting Absorption of Fats
11. Water properties
12. PH, Acidity, of various foods
13. Colours and Food Additives

Text Books:

1. Shakuntala Manay, Shadaksharaswamy. M (2017) Foods, Facts and Principles, New Age International Pvt Ltd Publishers, 2nd Edition
2. Chandrasekhar, U. Food Science and applications in Indian Cookery (2002) Phoenix Publishing House, New Delhi
3. Swaminathan, M. Food Science, (2015) Chemistry and Experimental Foods, Bappco Publishers, Bangalore.

Reference Books:

1. Meyer, L.H, Food Chemistry, (2004) CBS Publishers and Distributors, 4th edition
2. Paul, P.C. and Palmer, H.H. Food Theory and Applications.(2000). JohnWiley and Sons, New York.
3. Chopra H.K, Panesar, P.S, Food Chemistry (2010) Narosa Publishing House, New Delhi.

Evaluation Pattern:

Internal (CA)	External	Total
80	20	100

*CA – Regular Lab work assessment

Objectives:

To train students to convey and document information in a formal environment; to facilitate them to acquire the skill of self-projection in professional circles; to inculcate critical and analytical thinking.

Cos	Course Outcomes
CO 1	Illustrate comprehension of the fundamentals of writing
CO 2	Analyse audio text focussing on English phonetics, pronunciation and meaning comprehension
CO 3	Apply theoretical knowledge to write professional documents
CO 4	Infer from current news to formulate ideas and opinions
CO5	Prepare appropriate content for mini project and make effective presentation

Unit I

Vocabulary Building: One-word substitutes; Antonyms and Synonyms; Words often Confused Error Analysis (Subject-Verb Agreement; Tense Sequence; Usage of Articles and Prepositions; Determiners; Redundancy); Modifiers (misplaced, dangling, etc.)

Unit II

Circulars; Memos; Formal Letter writing; e-Mail Etiquette; Instruction, Suggestion & Recommendation; Essay writing: Analytical and Argumentative

Unit III

Sounds of English: Stress, Intonation - Listening Comprehension (3 pieces – Women in Technology Panel discussion, India Questions Abdul Kalam, UPSC Topper Mock interview Akshat Jain) - Current News Awareness

Unit IV

Reports: Incident Report, Event Report

Situational Dialogue; Group Discussion (Opinion)

Unit V

Mini Project and Presentation

References:

1. Felixa Eskey. *Tech Talk*, University of Michigan. 2005
2. Michael Swan. *Practical English Usage*, Oxford University Press. 2005
3. Anderson, Paul. *Technical Communication: A Reader Centered Approach*, V Edition, Hercourt, 2003.
4. Martinet, Thomson, *A Practical English Grammar*, IV Ed. OUP, 1986.
5. Raymond V. Lesikar and Marie E. Flatley. *Basic Business Communication*, Tata McGraw Hill Pub. Co. New Delhi. 2005. Tenth Edition.

6. Thampi, G. Balamohan. *Meeting the World: Writings on Contemporary Issues*. Pearson, 2013.
7. Lynch, Tony. *Study Listening*. New Delhi: CUP, 2008.
8. Kenneth, Anderson, Tony Lynch, Joan Mac Lean. *Study Speaking*. New Delhi: CUP, 2008.

9. Marks, Jonathan. *English Pronunciation in Use*. New Delhi: CUP, 2007.

10. Syamala, V. *Effective English Communication for You (Functional Grammar, Oral and Written Communication)*: Emerald, 2002.

11. Sample Question Papers from Competitive Examinations

12. Women in Technology Panel discussion

<https://youtu.be/T44XdGH5s-8?si=A1cDVEt777FH7vFR>

13. India Questions Abdul Kalam

https://youtu.be/erg3CmVm6M4?si=WjP_SV1vy6FrsGHg

14. UPSC Topper Mock interview, Akshat Jain

<https://youtu.be/lsJBGvyiAHI?si=L-u6kTadzJmghHLI>

Course objective:

- To develop independent reading skills and reading for appreciating literary works.
- To develop elaboration and modernization of the vocabulary of a language
- To enable the students to plan, draft, edit & present a piece of writing.

Course outcomes:

CO1: Develop the ability to read and critically appreciate a given text

CO2: Develop fluency in communication

CO3: Develop interest in blending of language and Indian Spirituality

CO4: To enable the learners to understand the grammatical structures of classes of words

Unit Topic

- 1 Memoirs-One of the Selection from Chiudambara Smarana-Balachandran Chulikkadu-Critical analysis of his poetry)
- 2 Ancient Drama: Kerala Sakunthalam (Act 4), Kalidasa (Translated by Attoor Krishna Pisharody).
- 3 Satire One of the Selection from Chemmanam Chacko,VKN Or Punathil Kunjabdulla-philosophical dimens of Satire
- 4 Part of an auto-biography/travelogue:
Valarnnu varunna oratmavu(from Kanneerum Kinavum)-VT Bhattathirippad
- 5 Error-freeMalayalam: 1.Language; 2.Clarity of expression; 3.Punctuation-Thettillatha Malayalam – Writing-a. Expansion of ideas

Text books/Reference:

- 1) Hasa Sahithyam Kuttikrishna Mararu
- 2) Sakunthalam-Attoor/Kuttikrishna Marar
- 3) Kalidasa Hridayam-K.P.Narayana Pisharady
- 4) VKN-K.P.Appan
- 5) N.V.Krishna Warriar & Modern Poetry studies
- 6) Kanneerum Kinavum –V.T. Bhattathirippad
- 7) Adukkalayil Ninnu Arangatheykku-V.T.Bhattathirippadu
- 8) Nalla Malayalam- C.V.Vasudeva Bhattathiri
- 9) Tettum Sariyum-Prof. Panmana Ramachandran Nair

Course Objective: The course will allow students to apply grammar in language structures, appreciate the literary compositions and provide them with a good command over translation techniques.

Course outcomes: By the end of the course the students will be able to:

1. Understand the postmodern trends of literature...
2. Explore tradition and culture through literature.
3. Apply ethical and professional translation strategies.
4. Demonstrate linguistic competence in written communication.

UNIT 1

Hindi Laghu Upanyas :**Mamatha Kaliya- ' Doud'**

UNIT 2

Hindi Natak: Swadesh Deepak- "Kort Marshal"

UNIT 3.

Adhunik Hindi Kavya a.Jayashankar Prasad-(Lahar, Aah!Vedhana Mili Vidayi)., b.Suryakanth Tripathi „Nirala“- (Anamika -4)., c.Subadhra Kumari , Chouhan- (Swadesh Ke Prathi, Smruthiyam), d.Gajanan Madhav Muktibodh- (ek swapna Katha)

UNIT 4.

A) Sankshepan,

B) .Anuvad: Paribhasha,Prakar,AnuvadKeLakshan,AnuvadKiAvashyakata,Passage (Translation)

c)Paragraph writing

D)Technical writing

REFERENCE

1. Prayojan Mulak Hindi Ke Naye Ayam : Dr. Pandit Banne
2. Prayojan Mulak Hindi Ki Nayi Bhumika : Kailash Nath Pandey
3. Prayojan Mulak Hindi Ke Vividh Roop : Dr. Rajendra Mishra, Rakesh Sharma
4. "Adhunik Kavya Sangraha" Edited by . Dr. Urvashi Sharma (Printed and Published by Malik & Company, Jaipur)
5. Hindi Samay.com,/Hindikahani.com/exotic indiaart.com

Objectives:

- To develop the standard of orthography and spelling system.
- To develop independent reading skills and reading for appreciating literary works.
- To develop elaboration and modernization of the vocabulary of a language.
- To enable the students to plan, draft, edit & present a piece of writing.

Course Outcome

CO1	Develop the ability to read and critically appreciate a given text
CO2	Develop pattern of communication as required for different professional context
CO3	Develop fluency in speaking the language

Course Contents**UNIT – 1****Prabandhagalu**

- Thotadacheya Bhoota – Kuvempu
- Bantu Bannada Holi – G. S. Shivarudrappa

UNIT – 2**Poems**

- Ni hinga nodabayda Nanna – Da. Ra. Bendre
- Huttarihaadu – Panje Mangesh Rao
- Tungabadre – K.S.Narasimhaswamy
- Nanna Janagalu – Dr.Siddhalingaya

UNIT – 3**Novel**

- Jugari Cross – Poornachandra Tejaswi

UNIT – 4

- Suttale
- Kadata
- prakatane
- Arjigalu
- Aadesha patraa

UNIT- 5

- Varadigalu
- Sanshikpta Baravanige
- Prabandhagalu: vaadaatmaka haagu vishleshanatmaka

References:

1. Jugari Cross – Poornachandra Tejaswi – Pustaka Prakashana
2. Shatamaanada Lalitha Prabandha – Gurulinga Kaapase - Karnataka Sahitya Academy
3. N.Gopalkrishna Adiga – Kannada Vyakarana mattu Rachane – MCC Publications
4. Maadhari Patragalu – S.R.Siddharaju – Kannada Saahitya Parishattu
5. H.S.Krishnaswamy Iyengar – Adalitha Kannada – Chetana publication, Mysuru

Module I

Seven cases, Avyayas, sentence making with Avyayas, Sapthakakaras.

Module II

Kthavathu Prathyaya, Upasargas, Kthvatha, Thumunnantha, LyabanthaPrathyaya. Three Lakaras – brief introduction, Lot lakara

Module III

New words and sentences for the communication, Slokas, moral stories, Subhashithas, riddles (Selected from the Pravesha Book)

Module IV

Introduction to classical literature, classification of Kavyas, classification of Dramas - Important five Mahakavyas

Module V

Translation of paragraphs from Sanskrit to English and vice versa

Module VI

Chanakya Neeti chapter III (Part II), Bhagavad Geeta chapter 14 (Part II)

Essential Reading:

- 1, Pravesaha; Publisher :Samskritabharati, Aksharam, 8th cross, 2nd phase, girinagar, Bangalore -560 085
- 2, Sanskrit Reader I, II and III, R.S. Vadhyar and Sons, Kalpathi, Palakkad
- 3, PrakriyaBhashyam written and published by Fr. John Kunnappally
- 4, Sanskrit Primer by Edward Delavan Perry, published by Ginn and Company Boston
- 5, Sabdamanjari, R.S. Vadyar and Sons, Kalpathi, Palakkad
- 6, Namalinganusasanam by Amarasimha published by Travancore Sanskrit series
- 7, SubhashitaRatnaBhandakara by Kashinath Sharma, published by Nirnayasagarpress

Course Objective: The course will allow students to understand the writing competency in Tamil literature.

Course outcomes: By the end of the course the students will be able to:

1. Introduction to Tamil Folklore
2. Learning the nuances of Tamil spiritual literature
3. Exposure to the advanced aspects of Tamil grammar
4. Imbibing the spirit of language through familiarising with linguistics, translation and creative writing

அலகு 1

சிறுநிலக்கியங்கள் அறிமுகம்: கலிங்கத் தப்பெரி (பதபார்தபாடிய), முக்கூற்றபள்ளு 35. தநாண்டுபுறவியல்: வரரவிலக்கெம், தநாண்டுபுறத்தபாண்கள், கரதகள், கரத்தபாண்கள், பழமதமாழி, விடுகரதகள், கரலகள்.

Introduction to CiRRilakkiyam: Kalingaththupparani (Poor Padiyathu) - MukkdaRpallu 35. Folklore: Definition, Folksongs - Stories - kathaipPaadal - pazhamozhi - vidukathai - kalaikaL.

அலகு 2

பக்திலக்கியம்: ஷெதாள்முழுவரதலாறு, திருத்தபாரவ (1,2,3,4)

அலகு 3

மததால்தகாப்பியம்: மதபாருளிலக்கெம் - தமால்லிலக்கெம்

அலகு 4

மதமாழிமபயப்பு: மதமாழிமபயப்பு வரககள், மதமாழிமபயர்ப்பின் முக்கியவமும்பதரவயும், இயந்திரமதமாழிமபயர்ப்பு, மதகாள்ரககள், இலக்கியமதமாழிமபயர்ப்பு. மதமாழியியல் அறிமுகம்: மதமாழியும்மதமாழியியலும், பயன்தபாடுமதமாழியின்தன்ரமகள், மதமாழியியல்பரறகள். பரைப்புஉருதவாக்குதல் (கருத்தபரிமாற்றம் - கவிரதிலக்கியம்- அறிமுகம், விடுதரலக்குமுன்மப்பின்ம - நாகம் - சிறுகதத).

Translation: Types of translation - Importance and need of translation - Machine translation - Principles - Literary translation.

Introduction to Linguistics: Language and Linguistics- Linguistics – Characteristics of applied language – Fields of Linguistics. Creation of creativity (Exchange of ideas - introduction to poetry literature, before and after liberation - drama - short story).

REFERENCES

மு.வரததரான்“ தமிழ்இலக்கியவரதலாறு” த
 ா ஹித்யஅகமைமிபப்ளிபகஷன்ஸ் , 2012 மதபான்மெதமாறன்
 “அபதைான்தமிழ்இலக்கெம் “அபதைான்பப்ளிஷிங்குருப், வஞ்சியூர்,
 திருவனந்தபுரம், 2007. <http://www.tamilvu.org/libirary/libindex.htm>.
http://www.gunathamizh.com/2013/07/blog0post_24.html தநா.தவானதமாமரல,
 “தமிழ்ரதநாண்டுத்தபாண்கள்” நியூமஞ்சரிபுத்தகமவளியீைைகம்
 1964,2006 தநா.தவானதமாமரல “பழங்கரதகளும்,
 பழமதமாழிகளும்
 ”நியூமஞ்சரிபுத்தகமவளியீைைகம், 1980,2008

Objectives:

- To expose the students to various genres of English Literature.
- To expose the students to Indian English Writing of different timelines.
- To develop sensibility to read and understand literature and thereby encourage them to be sensitive to the whole spectrum of human experience.

COs	Course Outcomes
CO 1	To demonstrate an ability to critically appreciate any literary text
CO 2	To exhibit an ability to narrate and express their thoughts and idea.
CO 3	To be able to evaluate and relate to common human experiences

Unit-I

Introduction:

Drama : Tragedy & Comedy, Characters, Setting

Prose: Fiction and Non-Fiction

Life Writing.: Biography, Autobiography, Memoirs

Unit-II

Essays:

Shashi Tharoor - A Child's Reading in India

Sarvepalli Radhakrishnan - Gandhian Outlook

Unit-III

Play: *Silence! The Court is in Session* by Vijay Tendulkar

Unit-IV

Non-Detail reading:

Karma – Khushwant Singh

Kailash Satyarthi's Nobel Lecture on 10 December 2014 at Oslo City Hall, Norway

Of Mothers, among other things. By A.K. Ramanujan

Unit-V

Critical Appreciation and Creative Writing: Class Activity

Core Reading

- Habib, M.A.R, *Literary Studies, A Norton Guide*, Norton & Co, 2020
- Naik, M.K., *A History of Indian English Literature*, Sahitya Academy

References:

- Tendulkar, Vijay, *Silence! The Court is in Session*, Oxford University Press, 1982
- Tharoor, Shashi, *A Child's Reading in India*, Washington Post, Dec 1991
- Gandhi Outlook and Techniques - Ministry of Education, January 1, 1953
- Singh, Khushwant, *Collected Short Stories*, Ravi Dayal Publishers, 1989
- Nobel Lecture – Audio [<https://www.youtube.com/watch?v=UNZNbcf5Hd8>]

Assessment Component	Weight age
Continuous Evaluation (Class Tests, Critical Appreciation, Creative Writing)	20
Mid Term Examination	30
End Semester Examination	50
Total	100

Course Objective(s)

To introduce students to the depths and richness of the Indian culture and knowledge traditions, and to enable them to obtain a synoptic view of the grandiose achievements of India in diverse fields. To equip students with a knowledge of their country and its eternal values.

Course Outcomes

COs	Description
CO1	This part deals with two topics: The Need to Become Fearless in Life and the Role or Status of Women in India.
CO2	This part deals with three topics: Teachings and Principles of Chanakya, Difference between the terms God and Iswara and Contribution of Bhagavad Gita
CO3	This area handles two important concepts: Indian Soft powers and A portrayal of how nature was preserved through the medium of Faith. Inner power is about never giving up on your dreams. To manifest more of what you desire in life, you must be prepared to embrace your inner power. You must be persistent if you want to succeed. Maintain your modesty and never stop learning. Inner strength is an attitude to life. Faiths shape and direct how we think, act, and live our lives. However, faith's power is not solely spiritual. To preserve nature, our forefathers established systems and traditions based on faith. Our culture and faith are intricately bound to nature.
CO4	Two important topics are discussed here: A Brief history of Ancient Indian Cultures and a Discussion on Practical Vedanta. Indian culture is the legacy of the ethno-linguistically diverse country's social norms, moral principles, traditional practices, belief systems, political systems, artefacts, and technologies. Following every invasion or change of political control, new kingdoms carried their respective cultures with them, adding to the Indian culture. Vedanta is the philosophy of the Upanishads. Every soul possesses the potential to be divine. The objective is to manipulate this inner divinity by invoking both internal and external natural forces.
CO5	From this part, a student gets an insight into the contribution that India has made to the world. Moreover, foreign powers have been trying to humiliate and degrade India in front of the world for so long. However, it should be recognized that many inventions that are considered beneficial to the world today have been contributed by the great men of India.

CO-PO Mapping

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO															
CO1	-	-	3	2	2	-	-	-	3	-	-	3	-	-	-
CO2	-	-	2	-	-	-	-	2	2	-	-	2	-	-	-
CO3	-	-	3	-	2	-	3	2	2	-	-	3	-	-	-
CO4	-	-	1	-	-	-	1	1	-	-	1	-	-	-	-
CO5	2	-	-	1	1	-	2	-	-	-	3	3	-	-	-

Syllabus

1. Chapter 1 - Face the Brutes
2. Chapter 2 - Role of Women in India
3. Chapter 3 - Acharya Chanakya
4. Chapter 4 - God and Iswara
5. Chapter 5 - Bhagavad Gita: From Soldier to Samsarin to Sadhaka

6. Chapter 6 - Lessons of Yoga from Bhagavad Gita
7. Chapter 7 - Indian Soft Powers: A Solution For Many Global Challenges
8. Chapter 8 - Nature Preservation through faith
9. Chapter 9 - Ancient Cultures what happened to them.
10. Chapter 10 - Practical Vedanta
11. Chapter 11 - To the World from India
12. Chapter 12 - Indian Approach to Science

Textbooks/References

1. Glimpses Of Glorious India

Evaluation Pattern

Assessment	Weightage (%)
Midterm	30
Continuous Assessment	20
End Semester Exam	50
Total Marks	100

SEMESTER III
NUTRITIONAL BIOCHEMISTRY

Semester III
Course Code: 25FSN201
L-T-P – 3-1-0-4

Hours of Instruction/ week – 4
No. of Credits – 4
Total 60 hrs.

Pre-requisite: School level chemistry of biomolecules

Course Objective: To impart knowledge on the biochemistry and metabolism of macronutrients and micronutrients.

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

CO1: Understand the fundamental concepts of nutrition and functions of enzymes and hormones.

CO2: Gain knowledge on the chemical/biochemical properties and metabolic pathways of carbohydrates, proteins, lipids and nucleotides.

CO3: Acquire a clear understanding on the significance of nucleic acids in protein synthesis.

Skills: To provide wide knowledge in connection to nutrition and biochemistry involved in the food components.

CO-PO Mappings

	PO 1	PO2	PO3	PO4	PO7	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	-	2	3	-	-	3	3	2	-	-
CO2	0	-	3	3	-	-	-	3	2	-	-
CO3	0	-	3	3	-	-	-	3	2	-	-

Syllabus:

UNIT I - Biomolecules

12 hrs

An overview of bio-macromolecules: carbohydrates, lipids, amino acids, proteins and nucleic acids

Unit II - Chemistry of Enzymes and Hormones

12 hrs

Enzymes - Classification, nomenclature and general properties - Mechanisms of enzyme action, regulation of enzyme activity - Role of coenzymes and cofactors in enzyme activity - Factors affecting enzyme activity - Enzyme inhibition - iso-enzymes and immobilized enzymes - Clinical significance of enzyme assays.

Hormones - Classification, second messengers, and mechanism of action - Neuro-endocrine control of metabolism - Hormonal disorders - Counter regulatory hormones.

Unit III - Chemistry of Carbohydrates and Proteins and their Metabolism 12 hrs

Carbohydrates, Aerobic and anaerobic degradation - Glycogenesis, Glycogenolysis, Gluconeogenesis - HMP shunt pathway -Alcoholic fermentation – Hormonal regulations of blood glucose. Proteins and amino acids – Classification, structure and physico-chemical properties - Protein degradation and metabolism - Urea cycle - Glutamine and alanine cycle – Protein biosynthesis.

Unit IV - Chemistry of Lipids and Nucleotides and their Metabolism 12 hrs

Lipids, Metabolic pathways of triacylglycerol, fatty acids, cholesterol and lipoproteins - Biosynthesis of fatty acids and ketone bodies. Nucleic acids: Classification - metabolism of nucleic acid components - Biosynthesis of nucleotides.

Unit V - Nucleic Acids 12 hrs

Chemistry and metabolism of nucleic acids: definition, components, nucleosides, nucleotides, structure of DNA and RNA, types of RNA, replication, transcription, role of DNA and RNA in protein synthesis. Basics of molecular biology and genetics, molecular basis of mutation, restriction enzymes, recombinant DNA technology, cloning of genes.

Textbooks:

1. Advanced Nutrition and Human Metabolism, Gropper SS, Smith, JL, and Groff JL, 7th Edition, 2018.
2. Wardlaw's Perspectives in Nutrition, Carol Byrd-Bredbenner, et al., 9th Edition, 2013.
3. Harper's Illustrated Biochemistry by Murray, Bender, Botham, Kennelly, Rodwell, and Well (McGraw Hill Publishers), 29th Edition.

Reference books:

1. Handbook of Food and Nutrition, Dr. M. S. Swaminathan, The Bangalore printing and publishing Co. Ltd. (Bangalore press), 2004.
2. Lehninger, Principles of Biochemistry, W H Freeman & Co, 2021.
3. Lubert Stryer, Jeremy M. Berg, Biochemistry, WH Freeman, 2019.
4. Color Atlas of Biochemistry by Koolman and Roehm. Thieme, 2nd edition, 2005.
5. Introduction to Nutrition and Metabolism, David A. Bender, 4th edition, CRC Press, 2008.

Evaluation Pattern

Assessment	Internal	External
P1+P2/Mid term	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar.

CLINICAL NUTRITION AND DIETETICS – I

Semester III

Course Code: 25FSN202

L-T-P – 2-2-0-4

Hours of Instruction/ week – 4

No. of Credits – 4

Total 60 hrs.

Pre-requisite: Dietary management & Role of Dietitians

Course Objective:

1. Extensive study of dietary management in common diseases.
2. Deals with role of dietician in hospital and community settings in nutrition care, case based study of patient's condition followed by dietary principles and management.

Course Outcomes:

CO1: Understand the basic concepts of Dietary management.

CO2: Acquire knowledge of the roles and responsibilities, skills, ethics and opportunities of a dietician and nutritional assessment methods.

CO3: Apply principles of diet therapy in infection and physiological stress.

CO4: Comprehend the causes, symptoms, and dietary management in malnutrition.

CO5: Gain knowledge on nutrition and diet therapy in adverse food reactions.

Skills:

- Enhance knowledge and skills of nutrition and to develop critical evaluation skills through an integration of nutrition, dietetics and research.
- Applying technical skills, knowledge of health behavior, clinical judgment, and decision-making skills when assessing and evaluating the nutritional status of individuals and communities.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	-	2	2	-	2	3	2	2	1
CO2	3	1	-	2	2	-	2	3	2	2	1
CO3	3	1	-	2	2	-	2	3	2	2	1
CO4	3	1	-	2	2	-	2	3	2	2	1
CO5	3	1	-	2	2	-	2	3	2	2	1

Syllabus:

Unit I: Fundamentals to Clinical Nutrition and Dietetics

9 hrs.

Definition and history of dietetics- Concepts of a desirable diet for optimum health-Interrelationship between food, nutrition and health- Factors affecting food choices, Physiologic factors regulating food intake- role of neurotransmitters and nutrients in hunger and satiety, Food Pyramid, My plate, Food Guidance System, Adjunct to diet therapy, Food and Drug Interactions

Unit II: Principles of Medical Nutrition Care and Role of Dietician

12 hrs.

Principles of MNT, Screening and Nutritional Assessment on hospital patients (ABCD) - Anthropometry, Biochemical, Clinical, Dietary Assessment, dietary Planning, Monitoring & Evaluation, documentation. role and responsibilities of dietitian- Definition, Diet counselling and nutrition educator, National and International Licensing- Registered Dietician – registration and membership, (IDA, NSI, NETPROFAN, ADA, HCPC, CORU, Dietitians of Canada, Dietitians Australia, Singapore Nutrition and Dietetics Association, DHA).

Unit III: Dietary Management in Infection and Physiological Stress **12hrs.**

Infection and Fever- General dietary considerations, Defense mechanism, metabolic changes during infection, Classification and etiology of fever/infection, Vicious Cycle of Malnutrition and Infection, nutritional management in Fever- Typhoid, Dengue, Malaria, Chronic disease-Tuberculosis, HIV & AIDS

Physiological Stress- Stress and Physiologic Effects, Nutrition in wound healing, Surgery: Pre and post-surgical dietary management, burns, trauma, sepsis.

Unit IV: Dietary Management in Malnutrition **15hrs.**

Regulation of food intake and pathogenesis of obesity and malnutrition and starvation, Weight Imbalance-Prevalence and Classification, Guidelines for Calculating Desirable body weight, Control of appetite and food intake - Neural control, hormonal control, insulin, estrogen and other peptides and hormones, Obesity-Etiology, Energy balance, Theories, Physiology of the obese state, Health risks, Dietary Management, Diet and lifestyle modification, Evaluation of some common diets-Atkins, Surgical Management Preventive aspects, Underweight – Etiology, Diet management, Nutrition management in eating disorders, Anorexia Nervosa, Bulimia.

Unit V: Nutrition Management in Food Allergies **12hrs.**

Definitions, types of reactions, symptoms, mechanism of food allergy, foods involved in sensitivity, diagnosis, treatment, food intolerance, Pathogenesis, food allergens, symptoms, tests for diagnosis, food allergies - pollen food allergy syndrome, latex –fruit syndrome, food dependent, exercise- induced anaphylaxis, food induced anaphylaxis, food –protein induced enterocolitis syndrome, cow's milk protein allergy (CMPA). Management - restricted diets, elimination diets and hypo- sensitization.

Reference Textbooks:

1. Srilakshmi. B. Dietetics, New age International Publishers, 9th Edition, 2023.
2. Davidson S, Passmore R, Breck JFT. Human Nutrition and Dietetics, The English Language Book Society and Churchill Livingstone, 1975.
3. Kathleen ML and Escott S. Krause's Food, Nutrition and Diet Therapy, 11th edn, W.B. Saunders Company Pennsylvania, 2017.
4. Krause and Mahan's Food and the Nutrition Care Process, 16th Edition, Janice L Raymond & Kelly Morrow, 2023

Suggested Readings:

1. Bemadette. M. Marriott and Sydne J Carlson, Nutritional needs in cold and high altitude environments
2. Cresci, P. D. (Ed.). (2015). Nutrition support for the critically ill patient: A guide to Practice. CRC Press.
3. Escott-Stump, S. (2008). Nutrition and diagnosis-related care. Lippincott Williams & Wilkins.
4. Gable, J., & Herrmann, T. (2015). *Counselling skills for Dietitians*. John Wiley & Sons.
5. Nelms, M., & Sucher, K. (2015). Nutrition therapy and pathophysiology. Nelson Education

Evaluation Pattern

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

NUTRITIONAL BIOCHEMISTRY PRACTICAL

Semester III
Course Code: 25FSN281
L-T-P – 0-0-3-1

Hours of Instruction/ week – 3
No. of Credits – 1
Total 45 hrs.

Pre requisite: Basics on handling glassware, chemicals and reagents

Course Objective: To impart knowledge qualitative and quantitative estimation of the given sample.

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

CO1: Understand the fundamental concepts biomolecules.

CO2: Gain hands on experience in quantitative and qualitative analysis of different samples

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	-	-	2	2	1	-	1	3	-
CO2	3	2	-	-	2	2	1	-	1	3	-

Practical

45hrs.

S.No.	List of Experiments
1.	Reactions of glucose, fructose, galactose, maltose, lactose and sucrose
2.	Determination of Acid Number of an oil
3.	Determination Of Iodine Number of An Oil
4.	Determination Of Saponification Number of An Oil
5.	Reactions of Tyrosine, Tryptophan and Arginine
6.	Estimation Of Protein (Biuret Method)
7.	Estimation Of Glucose (Folin Wu Method)
8.	Estimation Of Urea (Dam – TSC Method)
9.	Estimation Of Uric Acid (Caraway Method)

Textbooks:

1. Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry, William Itinmaon Medical Books, London, 2010.
2. Oser, B.L., Harke's Physiological Chemistry XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2011

Reference Books:

1. Sadasivam, S. and Manickam, A. Biochemical Method, Second Edition, New Age International P. Ltd., Publishers, New Delhi, 2013.
2. Raghuramulu, N., Madhavannair, K. and Kalyana Sundaram, National Institute of Nutrition, 2013, A Manual of Laboratory Techniques, Hyderabad, 500007

Evaluation Pattern:

Internal (CA)	External	Total
80	20	100

*CA – Regular Lab work assessment

CLINICAL NUTRITION AND DIETETICS – I PRACTICAL

Semester III

Course Code: 25FSN282

L-T-P – 0-0-3-1

Hours of Instruction/ week – 3

No. of Credits – 1

Total 45 hrs.

Pre-requisite: Diet management & Role of Dieticians

Course Objective:

- Acquire proficiency in the preparation of various therapeutic diets essential for clinical nutrition, including specialized hospital diets
- Develop the ability to formulate customized daily menus catering to specific health and special conditions.
- Expand knowledge and understanding of therapeutic dietary interventions during acute disease conditions.

Course Outcomes:

CO01: Understand the basic dietary principles involved in planning diets, different malnutrition and special conditions.

CO02: Plan and prepare diets to meet the quality and quantity requirements for specific acute disease conditions.

Skills: Develop skills to plan and prepare a short term acute therapeutic diet

CO PO Mappings:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO01	1	3	-	1	-	2	1	1	3	-	1
CO02	1	3	-	1	-	2	1	2	3	-	1

Practical

45hrs.

S.No.	Title of experiments	Course Outcome
Diet during Malnutrition & Special Conditions		
1	Learn to prepare hospital special diets - Clear liquid, Fluid, Soft, Bland, Enteral and Parenteral diet	CO 01
2	A day's menu for a school going boy who is suffering from diarrhoea	CO 01
3	A day's menu for an old woman suffering from constipation	CO 01
4	A day's menu for an underweight adolescent girl of low income	CO 01
5	A day's menu for an underweight adolescent girl of high income	CO 01
6	A day's alternate menu for a 17yr old girl suffering with iron deficiency anaemia	CO 01
7	A day's menu for a pregnant woman suffering from Gestational Diabetes	CO 01
Diet During Acute Disease Condition		
1	A day's menu for an adult woman suffering from HIV	CO 02
2	A day's menu for an adult man suffering from Acute renal failure (AKI)	CO 02
3	A day's menu for a schoolboy suffering from Typhoid	CO 02
4	A day's menu for an adolescent girl suffering from jaundice	CO 02
5	A day's menu for an adult man suffering from Hepatitis	CO 02
6	A day's menu for a 50 yr old man suffering from Calcium stone	CO 02
7	A day's menu for a 7yr old boy suffering from Glomerulonephritis	CO 02

Textbooks & Reference Books:

1. Srilakshmi, V. Dietetics New Age International P. Ltd., 9th edition, New Delhi, 2023.
2. Nutrition and Dietetics by B. Srilakshmi (Latest edition: 2020)
3. Textbook of Clinical Nutrition and Dietetics by P. Vasudevan and L. Sreedhar (Latest edition: 2019)
4. Clinical Nutrition: Enteral and Tube Feeding by John L. Rombeau and Roland G. Phillips (Latest edition: 2018)
5. Krause's Food & the Nutrition Care Process" by L. Kathleen Mahan and Janice L. Raymond - The most recent edition is the 16th edition, published in 2023.
6. "Nutrition Therapy and Pathophysiology" by Marcia Nelms, Kathryn P. Sucher, and Sara Long Roth - The most recent edition is the 4th edition, published in 2019.
7. "Williams' Basic Nutrition & Diet Therapy" by Staci Nix McIntosh and Sara Long Roth - 15th edition, published in 2020.

Evaluation Pattern:

Internal (CA)	External	Total
80	20	100

CA – Regular Lab work assessment

BASICS OF COMPUTER APPLICATIONS

Semester III
Course Code: 25FSN203
L-T-P – 2 0 0 -2

Hours of Instruction/ week – 2
No. of Credits – 2
Total - 30 hrs.

Pre requisite: Basics of computer usage, Windows, Microsoft office

Course Objectives:

1. To learn the computer peripherals in the operation of computers
2. To understand the computer network in sharing of information through computers
3. To acquire the skills in the applications of windows in documentation, data analysis and presentation

Course Outcomes:

CO1: Understanding the basic Components of Computers and Network elements.

CO2: Developing professional-looking newsletters, pamphlets, charts, simple calculations etc using the authorizing tools

CO3: Able to create and manage databases & develop a presentation skills using the authorizing tools

CO4: Elicit multimedia presentation focusing on utilization of authorizing tools.

CO5: Able to apply computer applications in meal management practices and explore the nutritional software's and ejournals in professional and academic endeavours.

Skills: Acquire the skills in exploring windows applications in development of documents, data analysis in spread sheet and power point presentation.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	-	1	-	-	2	1	-	-	2	2
CO2	1	-	1	-	-	2	1	-	-	2	2
CO3	1	-	1	-	-	2	1	-	-	2	2
CO4	1	-	1	-	-	2	1	-	-	2	2
CO5	1	-	1	-	-	2	1	-	-	2	2

Syllabus:

Unit I - Introduction to Computers & Networks

6hrs.

Introduction to Computers - Operating System, CPU, Input and Output Devices, Main and Auxiliary Storage Devices, Software and Hardware, Introduction to Computer Networks, Basics of HTML, WWW, URL, Email, Network Security

Unit II – Word Processing and Spreadsheets

6hrs.

Word Processing- Basics of creating a document, Formatting a document, Printing a document. Spreadsheet – Basics of creating a worksheet, Creating tables, charts, pivot table & charts, Working with formulas

Unit III – Database Management system and Presentation**6hrs.**

Database Management system – Creating a database table, queries, Developing forms and reports, Presentation- Creating a presentation using slide master and template, Formatting the slides, Animations, Transitions, Slide show

Unit IV - Multimedia**6hrs.**

Introduction of multimedia, Basic Elements, Hardware, Applications of Multimedia, Authorizing Tools, Introduction to Video, and Audio editing software's.

Unit V - Application of Computers in Food Science and Nutrition**6hrs.**

Applications - Nutrition Education and Counselling, Nutrient and Diet calculations, Use of statistical software, Accessing Digital Library, e-Journals in Food Science and Nutrition, Relevant Nutrition software's, Applications and Webpages.

Text books:

1. Microsoft Office 2019 Complete, BPB Publications
2. Dinesh Maidasani – Learning Computer Fundamentals, MS Office and Internet and Web Technology, Laxmi Publications

Reference Books:

1. BPB's Computer Course Windows 10 with MS Office 2016.
2. John Walkenbach Herb Tyson Michael R. Groh Faithe Wempen Lisa A. Bucki – Microsoft Office 2010 Bible, Wiley India.
3. Andrew S. Tanenbaum (2009) IV Edition, Computer Networks, Pearson Education and Dorling Kindersley Publishers, Delhi.
4. Ralf Steinmetz and Klara Nahrstedt (2011) Multimedia- Computing, Communications and Applications, Pearson Education and Dorling Kindersley Publishers, Delhi.
5. Learn Microsoft Office 2019: A comprehensive guide to getting started with Word, PowerPoint, Excel, Access, and Outlook by Linda Foulkes

Evaluation pattern:

Assessment	Internal	External
Periodical 1/Periodical 2/Midterm	30	
*Continuous Assessment (CA)	40	
End Semester		30
Total	100	

*Lab evaluation 20 marks, Project 10 marks, Assignment/seminar 10 marks.

Pre-requisite: An open mind and the urge for self-development, basic English language skills, knowledge of high school level mathematics.

Course Objective: To assist students in inculcating soft skills, developing a strong personality, empowering them to face life's challenges, improving their communication skills and problem-solving skills.

Course Outcomes

CO1: Soft Skills - To develop the self-confidence and positive attitude to face, analyze, and manage emotions in real life situations, like placement process.

CO2: Soft Skills - To empower students to create a better impact on a target audience through content creation, effective delivery, appropriate body language and overcoming nervousness, in situations like presentations, Group Discussions and interviews.

CO3: Aptitude – To analyze, understand and solve questions in arithmetic and algebra by employing the most suitable methods.

CO4: Aptitude - To investigate and apply suitable techniques to solve questions on logical reasoning.

CO5: Verbal – To infer the meaning of words & use them in the right context. To have a better understanding of the nuances of English grammar and become capable of applying them effectively.

CO6: Verbal - To identify the relationship between words using reasoning skills. To develop the capacity to communicate ideas effectively.

Skills: Communication, self-confidence, emotional intelligence, presentation skills and problem-solving Skills.

CO-PO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1				2	2	2	2
CO2					2	2	2
CO3							3
CO4							3
CO5						3	3
CO6					3	3	3

Syllabus

Soft Skills

Soft Skills and its importance: Pleasure and pains of transition from an academic environment to work-environment. New-age challenges and distractions. Learning to benefit from constructive criticisms and feedback. Need for change in mindset and up-skilling to keep oneself competent in the professional world.

Managing Self: Knowing oneself, Self-perception, Importance of positive attitude, Building and displaying confidence, Avoiding being overconfident, Managing emotions, stress, fear. Developing Resilience and handling failures. Self-motivation, Self-learning, and continuous knowledge up-gradation / Life-long learning. Personal productivity - Goal setting and its importance in career planning, Self-discipline, Importance of values, ethics and integrity, Universal Human Values.

Communication: Process, Language Fluency, Non-verbal, Active listening. Assertiveness vs. aggressiveness. Barriers in communication. Digital communication

Aptitude

Numbers: Types, Power Cycles, Divisibility, Prime, Factors & Multiples, HCF & LCM, Surds, Indices, Square roots, Cube Roots and Simplification.

Percentage: Basics, Profit, Loss & Discount, and Simple & Compound Interest.

Ratio, Proportion & Variation: Basics, Alligations, Mixtures, and Partnership.

Averages: Basics, and Weighted Average.

Equations: Basics, Linear, Quadratic, Equations of Higher Degree and Problems on ages.

Logical Reasoning I: Blood Relations, Direction Test, Syllogisms, Series, Odd man out, Coding \& Decoding, Cryptarithmic Problems and Input - Output Reasoning.

Verbal Skills

Vocabulary: Familiarize students with the etymology of words, help them realize the relevance of word analysis and enable them to answer synonym and antonym questions. Create an awareness about the frequently misused words, commonly confused words and wrong form of words in English.

Grammar (Basics): To learn the usage of grammar and facilitate students to identify errors and correct them.

Reasoning: Stress the importance of understanding the relationship between words through analogy questions. Emphasize the importance of avoiding the gap (assumption) in the argument/ statements/ communication.

Speaking Skills: Make students conscious of the relevance of effective communication in today's world through individual speaking activities.

Writing Skills: Introduce formal written communication and keep the students informed about the etiquette of email writing.

References:

1. Gulati. S., (1006) "Corporate Soft Skills", New Delhi, India: Rupa & Co.
2. The hard truth about Soft Skills, by Amazon Publication.
3. Verbal Skills Activity Book, CIR, AVVP
4. Nova's GRE Prep Course, Jeff Kolby, Scott Thornburg & Kathleen Pierce
5. The BBC and British Council online resources
6. Owl Purdue University online teaching resources
7. www.thegrammarbook.com online teaching resources
8. www.englishpage.com online teaching resources and other useful websites
9. Student Workbook: Quantitative Aptitude & Reasoning, Corporate & Industry Relations, Amrita Vishwa Vidyapeetham.
10. Quantitative Aptitude for All Competitive Examinations, Abhijit Guha.
11. How to Prepare for Quantitative Aptitude for the CAT, Arun Sharma.
12. How to Prepare for Data Interpretation for the CAT, Arun Sharma.
13. How to Prepare for Logical Reasoning for the CAT, Arun Sharma.
14. Quantitative Aptitude for Competitive Examinations, R S Aggarwal.
15. A Modern Approach to Logical Reasoning, R S Aggarwal.
16. A Modern Approach to Verbal & Non-Verbal Reasoning, R S Aggarwal.

Evaluation Pattern

Assessment	Internal	External
Continuous Assessment (CA)* – Soft Skills	30	-
Continuous Assessment (CA)* – Aptitude	10	25
Continuous Assessment (CA)* – Verbal	10	25
Total	50	50

*CA - Can be **presentations, speaking activities and tests.**

22AVP201 Message from Amma's Life for the Modern World

Amma's messages can be put to action in our life through pragmatism and attuning of our thought process in a positive and creative manner. Every single word Amma speaks and the guidance received in on matters which we consider as trivial are rich in content and touches the very inner being of our personality. Life gets enriched by Amma's guidance and She teaches us the art of exemplary life skills where we become witness to all the happenings around us still keeping the balance of the mind.

22ADM211 Leadership from the Ramayana

Introduction to Ramayana, the first Epic in the world – Influence of Ramayana on Indian values and culture – Storyline of Ramayana – Study of leading characters in Ramayana – Influence of Ramayana outside India – Relevance of Ramayana for modern times.

22ADM201 Strategic Lessons from the Mahabharata

Introduction to Mahabharata, the largest Epic in the world – Influence of Mahabharata on Indian values and culture – Storyline of Mahabharata – Study of leading characters in Mahabharata – Kurukshetra War and its significance - Relevance of Mahabharata for modern times.

22AVP204 Lessons from the Upanishads

Introduction to the Upanishads: Sruti versus Smrti - Overview of the four Vedas and the ten Principal Upanishads - The central problems of the Upanishads – The Upanishads and Indian Culture – Relevance of Upanishads for modern times – A few Upanishad Personalities: Nachiketas, Satyakama Jabala, Aruni, Shvetaketu.

22AVP205 Message of the Bhagavad Gita

Introduction to Bhagavad Gita – Brief storyline of Mahabharata - Context of Kurukshetra War – The anguish of Arjuna – Counsel by Sri. Krishna – Key teachings of the Bhagavad Gita – Karma Yoga, Jnana Yoga and Bhakti Yoga - Theory of Karma and Reincarnation – Concept of Dharma – Concept of Avatar - Relevance of Mahabharata for modern times.

22AVP206 Life and Message of Swami Vivekananda

Brief Sketch of Swami Vivekananda's Life – Meeting with Guru – Disciplining of Narendra - Travel across India - Inspiring Life incidents – Address at the Parliament of Religions – Travel in United States and Europe – Return and reception India – Message from Swamiji's life.

22AVP207 Life and Teachings of Spiritual Masters India

Sri Rama, Sri Krishna, Sri Buddha, AdiShankaracharya, Sri Ramakrishna Paramahansa, Swami Vivekananda, Sri Ramana Maharshi, Mata Amritanandamayi Devi.

22AVP208 Insights into Indian Arts and Literature

The aim of this course is to present the rich literature and culture of Ancient India and help students appreciate their deep influence on Indian Life - Vedic culture, primary source of Indian Culture – Brief introduction and appreciation of a few of the art forms of India - Arts, Music, Dance, Theatre.

22AVP209 Yoga and Meditation

The objective of the course is to provide practical training in YOGA ASANAS with a sound theoretical base and theory classes on selected verses of Patanjali's Yoga Sutra and Ashtanga Yoga. The coverage also includes the effect of yoga on integrated personality development.

22AVP210 Kerala Mural Art and Painting

Mural painting is an offshoot of the devotional tradition of Kerala. A mural is any piece of artwork painted or applied directly on a wall, ceiling or other large permanent surface. In the contemporary scenario Mural painting is not restricted to the permanent structures and are being done even on canvas. Kerala mural paintings are the frescos depicting mythology and legends, which are drawn on the walls of temples and churches in South India, principally in Kerala. Ancient temples, churches and places in Kerala, South India, display an abounding tradition of mural paintings mostly dating back between the 9th to 12th centuries when this form of art enjoyed Royal patronage. Learning Mural painting through the theory and practice workshop is the objective of this course.

22AVP213 Traditional Fine Arts of India

India is home to one of the most diverse Art forms world over. The underlying philosophy of Indian life is ‘Únity in Diversity” and it has led to the most diverse expressions of culture in India. Most art forms of India are an expression of devotion by the devotee towards the Lord and its influence in Indian life is very pervasive. This course will introduce students to the deeper philosophical basis of Indian Art forms and attempt to provide a practical demonstration of the continuing relevance of the Art.

22AVP214 Principles of Worship in India

Indian mode of worship is unique among the world civilizations. Nowhere in the world has the philosophical idea of reverence and worshipfulness for everything in this universe found universal acceptance as it in India. Indian religious life even today is a practical demonstration of the potential for realization of this profound truth. To see the all-pervading consciousness in everything, including animate and inanimate, and constituting society to realise this truth can be seen as the epitome of civilizational excellence. This course will discuss the principles and rationale behind different modes of worship prevalent in India.

22AVP215 Temple Mural Arts in Kerala

The traditional percussion ensembles in the Temples of Kerala have enthralled millions over the years. The splendor of our temples makes art enthusiast spellbound, warmth and grandeur of color combination sumptuousness of the outline, crowding of space by divine or heroic figures often with in vigorous movement are the characteristics of murals.

The mural painting specially area visual counterpart of myth, legend, gods, dirties, and demons of the theatrical world, Identical myths are popular the birth of Rama, the story of Bhīma and Hanuman, Shiva, as Kirata, and the Jealousy of Uma and ganga the mural painting in Kerala appear to be closely related to, and influenced by this theatrical activity the art historians on temple planes, wood carving and painting the architectural plane of the Kerala temples are built largely on the pan-Indians almost universal model of the Vasthupurusha.

22AVP218 Insights into Indian Classical Music

The course introduces the students into the various terminologies used in Indian musicology and their explanations, like Nadam, Sruti, Svaram – svara nomenclature, Stayi, Graha, Nyasa, Amsa, Thala, - Saptatalas and their angas, Shadangas, Vadi, Samavadi, Anuvadi. The course takes the students through Carnatic as well as Hindustani classical styles.

22AVP219 Insights into Traditional Indian Painting

The course introduces traditional Indian paintings in the light of ancient Indian wisdom in the fields of aesthetics, the Shadanga (Sixs limbs of Indian paintings) and the contextual stories from ancient texts from where the paintings originated. The course introduces the painting styles such as Madhubani, Kerala Mural, Pahari, Cheriya, Rajput, Tanjore etc.

22AVP220 Insights into Indian Classical Dance

The course takes the students through the ancient Indian text on aesthetics the Natyasastra and its commentary the AbhinavaBharati. The course introduces various styles of Indian classical dance such as Bharatanatyan, Mohiniyattom, Kuchipudi, Odissi, Katak etc. The course takes the students through both contextual theory as well as practice time.

22AVP221 Indian Martial Arts and Self Defense

The course introduces the students to the ancient Indian system of self-defense and the combat through various martial art forms and focuses more on traditional Kerala’s traditional KalariPayattu. The course introduces the various exercise technique to make the body supple and flexible before going into the steps and techniques of the martial art. The advanced level of this course introduces the technique of weaponry.

SEMESTER IV
FOOD MICROBIOLOGY

Semester IV
Course Code:25FSN211
L-T-P – 3-0-0-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs.

Pre-requisite: Basic knowledge -microorganisms, food-based microbes.

Course Objective:

1. To obtain knowledge on morphology of microorganisms and types of microscopy
2. To understand the factors influencing the growth of microorganisms
3. To apply the preservation principles and methods to preserve the foods from microbial contamination
4. To explore the beneficial effects of microorganisms in the development of food products.

Course Outcomes:

CO1: Gain a better understanding of microorganisms and microscope, its vital role in the field of microbiology.

CO2: Able to understand the chances of spoilage in plant-based foods.

CO3: Able to evaluate microbial quality of foods

CO4: Explore the pivotal role of microorganisms in fermentation technology.

CO5: Able to differentiate food infection and intoxication.

Skills: Develop skills in identification, testing and control of microorganisms in relation to food safety.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	-	1	-	2	-	-	2	-
CO2	3	1	1	-	1	-	2	-	-	2	-
CO3	3	1	1	-	1	-	2	-	-	2	-
CO4	3	1	1	-	1	-	2	-	-	2	-
CO5	3	1	1	-	1	-	2	-	-	2	-

Syllabus:

Unit I: Introduction to Microbiology, Morphology and Growth factors of Microorganisms 9hrs.

Definition and History, Microscopy, Light and electron Microscopy, General Morphology of Microorganisms Bacteria, Fungi, Algae, Yeast and Virus-Bacteriophage, Microbial Biomass, Growth Curve, Definition of Batch and Continuous culture, Factors Affecting Growth - Intrinsic Factors, Nutrient Content, pH, Redox Potential, Antimicrobial, Barrier and Water Activity. Extrinsic Factors: Relative Humidity, Temperature and Gaseous Atmosphere, Enumeration strategy of microorganisms, Simple microbial test- sampling, counting

Unit II: Microbiology of Plant based Foods 9 hrs.

Outline of Contamination, Spoilage and Preservation of Vegetables and Fruits, Cereals and Cereal Products, Pulses, Nuts and oilseeds, Sugar and Sugar Products

Unit III Evaluation of Microbial Quality of Foods 9hrs.

Methods, Assays used to assess the Microbial Loads of different foods, Permitted levels of Microbial Load in different foods, Microbes responsible for Food Quality, Microbiological evaluation standards.

Unit IV: Beneficial Effects of Microorganisms 9 hrs.

Fermented Foods – Curd, Cheese, Sauerkraut, Meat, Soy Based Foods, Alcoholic Beverages and Vinegar

Unit V: Food Intoxication and Food Infection 9 hrs.

Food Borne Diseases – Classification- Intoxication – Botulism and Staphylococcal intoxication- Infection – Salmonellosis, Clostridium Perfringens illness, Bacillus cereus, Ecoli, Shigellosis, Yersinia and Streptococcus faecalis – Foods involved, Disease's outbreak, Preventive and control measures.

Reference Textbooks:

1. Jay M.J (2015) Modern Food Microbiology, Fourth Edition, CBS Publishers and Distributors, New Delhi
2. Ramesh, K.V (2012) Food Microbiology, MJP Publishers, Chennai.
3. Tamime, A (2015) Probiotic Dairy Products, Blackwell Publishing, USA.
4. William C. Frazier (2014) Food Microbiology, Tata McGraw Hills Publishing Company Limited, Chennai.

Suggested Readings:

1. Adams, MR and Moss, MO (2015) Food Microbiology, New Age International (P) Ltd., New Delhi.
2. Cappuccino G.J and Sherman, N (2008) Microbiology – A Laboratory Manual, Pearson Education Publishers, USA,.
3. Jay M.J (2015) Modern Food Microbiology, Fourth Edition, CBS Publishers and Distributors, New Delhi.

Evaluation Pattern

Assessment	Internal	External
Periodical1/Periodical 2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50
Total	100	

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

CLINICAL NUTRITION AND DIETETICS – II

Semester IV
Course Code: 25FSN212
L-T-P – 2-2-0-4

Hours of Instruction/ week – 4
No. of Credits – 4
Total 60 hrs.

Pre-requisite: Medical Nutrition Therapy & Diseases

Course Objective:

1. To give better understanding on the role of nutrition for managing disease condition.
2. To create better knowledge on different therapeutic diets and their applications.
3. To acquire relevant skills to develop as a dietitian.

Course Outcomes:

CO1: Understand the types of therapeutic and requirements of special diets.

CO2: Gain core knowledge on the dietary management of metabolic syndrome and associated disorders

CO3: Gain experience on the dietary management of gastrointestinal tract disorders

CO4: Gain knowledge on the dietary planning for liver and kidney diseases

CO5: Understand the dietary management involved in neoplastic and specific diseases

Skills:

- Develop skills and techniques in the planning and preparation of diets for various disease conditions
- Applying principles of diet therapy in planning, preparation and nutrient calculation of hospital diets, therapeutic diets for various diseases

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	-	2	2	-	2	3	2	2	1
CO2	3	1	-	2	2	-	2	3	2	2	1
CO3	3	1	-	2	2	-	2	3	2	2	1
CO4	3	1	-	2	2	-	2	3	2	2	1
CO5	3	1	-	2	2	-	2	3	2	2	1

Syllabus:

Unit I: Introduction to Therapeutic and Special Diets

9 hrs.

Types of therapeutic diets, routine hospital diet-customized diet plan- Regular Diets, Mechanically Altered or Fiber-Restricted Diets, Liquid Diets, Diet for Dysphagia, Diet Modifications for Therapeutic Care - Modifying Basic Nutrients, Modifying Energy Value, Modifying Texture or Consistency, Modifying Seasonings, Special feeding methods- enteral nutrition, parenteral nutrition, tube feeding, malnutrition in hospitalized patients-the cycle of malnutrition and infection

Types of special diet- vegan diet, gluten-free diet, Ketogenic diet, Atkins diet, Mediterranean diet, Diabetic diet, Renal diet, DASH diet, low fat diet, Paleolithic diet, FAD diet, current trends in personalized nutrition.

Unit II - Dietary Management of Metabolic Syndrome Disorders

15 hrs.

Diabetes mellitus – types, etiology, symptoms and diagnosis, aims of dietary treatments, special dietary consideration for type I and II diabetics, complications of diabetes, Food exchange list, Glycemic Index, glycemic load, CHO counting, Sweeteners and Sugar Substitutes, significance of physical activity

Diseases of the heart and blood vessels- etiology, symptoms and diagnosis; atherosclerosis, lipids and other dietary factors and coronary heart diseases (CHD). Diet in CHD, hypertension, congestive heart failure and hyperlipidemia.

Unit III: Dietary Management of Gastrointestinal Disease

12hrs.

Pathophysiology of GI Tract Diseases - Anatomic, Physiologic and Functional Changes, Impact on Nutritional Status, Diseases of Esophagus and Stomach-Nutritional requirement and dietary modification in Esophagitis, Dyspepsia, GERD, Peptic Ulcer, Gastritis, Gastrectomy -Dumping Syndrome, Intestinal Diseases, Flatulence, Diarrhoea, Constipation, Hemorrhoids, Diverticular disease, Inflammatory Bowel Disease- Crohn's disease Ulcerative Colitis, Irritable bowel syndrome, Malabsorption Syndrome.

Unit IV - Dietary Management in Liver and Kidney Diseases

12 hrs.

Diseases of the liver - functions of liver, clinical assessment of liver function. Pathogenesis, signs and symptoms of hepatitis, acute liver failure, cirrhosis and encephalopathy. Nutritional management in liver diseases.

Dietary management in gallbladder diseases.

Diseases of the kidney - functions of kidney, clinical assessment of kidney function. Pathogenesis, signs and symptoms of acute and chronic renal failure, nephrotic syndrome and renal calculi. Nutritional management in kidney diseases and during renal replacement therapy

Unit V - Dietary Management in Neoplastic and Specific Diseases

12hrs.

Cancer- Types, stages and markers, Nutrition in the etiology of cancer, Nutritional effects of cancer and cancer therapy, nutritional care of cancer patient, Guidelines on Quality of Life improvement, food supplementary.

Gout- Role of protein & purine, Etiology, Symptoms & complication, dietary Management. Inborn Errors of Metabolism- PKU, MSUD, Tyrosinemia, Homocystinuria, Glycogen storage Disorder, Galactosemia, Glutaricaciduria, Other Types.

Reference Textbooks:

1. Srilakshmi. B. Dietetics, New age International Publishers, 9th Edition, 2023.
2. Davidson S, Passmore R, Breck JFT. Human Nutrition and Dietetics, The English Language Book Society and Churchill Livingstone, 1975.
3. Kathleen ML and Escott S. Krause's Food, Nutrition and Diet Therapy, 11th edn, W.B. Saunders Company Pennsylvania, 2017.
4. Krause and Mahan's Food and the Nutrition Care Process, 16th Edition, Janice L Raymond & Kelly Morrow, 2023
5. Robinson CH. Normal and Therapeutic Nutrition. Oxford Publishing Co, Bombay, 1972.

Suggested Readings:

1. Erdman JW, Macdonald IA and Zeisel SH. Present Knowledge in Nutrition, 10th edn, International Life Sciences Institute Press, Washington DC, 2012.
2. Shills ME, Olson JA, Moshe S and Ross CA. Modern Nutrition in Health and Disease, 9th edn, Lippincott Williams and Wilkins, 2006.
3. Gibney MJ, Macdonald IA and Roche HM. Nutrition and Metabolism, Blackwell Publishing, UK, 2003.
4. Gibney MJ, Elia M, Ljungqvist O and Dowsett J. Clinical Nutrition, Blackwell Publishing, UK, 2005.
5. Park K. Text Book of Preventive and Social Medicine. 21st edn, Banarsidas Bhanot Publishers, Jabalpur, India, 2011.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD MICROBIOLOGY PRACTICAL

Semester IV

Course Code:25FSN283

L-T-P – 0-0-3-1

Hours of Instruction/ week – 3

No. of Credits – 1

Total 45 hrs.

Course Objectives:

1. Understand the different methods of sterilization and disinfection
2. Impart knowledge on different aseptic and pure culture techniques for enumeration of microbes

Course Outcomes:

CO1: Acquire knowledge on different microbial techniques associated with food samples.

CO2: Gain practical experience on enumeration of bacteria, yeast and molds in foods samples

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	-	-	2	2	3	-	1	3	-
CO2	3	1	-	-	2	2	3	-	1	3	-

Practicals:

S.No.	List of Experiments
1.	Instruments used in microbiological laboratory, their principles and working
2.	Methods of sterilization and disinfection
3.	Media preparation
4.	Preparation of samples for microbial analysis using different diluents
5.	Aseptic Culture Techniques
6.	Isolating bacteria: Pure culture techniques
7.	Enumeration of bacteria from different food sample
8.	Microbial staining techniques
9.	Microbial examination of processed foods
10.	Biochemical tests for identification of bacteria.
11.	Assessment of microbiological quality of milk sample using Methylene Blue Dye Reduction Test

Text Books:

1. Silva N.D, Taniwaki M.H., Valéria C.A. Junqueira V.C.A, Silveira N., Okazaki M.M., Gomes R.A.R. (2018). Microbiological Examination Methods of Food and Water- A Laboratory Manual, 2nd Edition. CRC Press, USA.
2. Waite-Cusic J.G., Yousef A.E. and Jennifer J. Perry J.J. (2022). Analytical Food Microbiology. A Laboratory Manual. Wiley Publishers, USA.

Evaluation Pattern:

Internal (CA)	External	Total
80	20	100

*CA – Regular Lab work assessment

CLINICAL NUTRITION AND DIETETICS – II PRACTICAL

Semester IV

Course Code:25FSN284

L-T-P – 0-0-3-1

Hours of Instruction/ week – 3

No. of Credits – 1

Total 45 hrs.

Pre-requisite: Diet management & Role of Dieticians

Course Objectives:

1. To develop competency in formulating specialized dietary plans tailored to individual needs and conditions, focusing on chronic diseases.
2. To acquire proficiency in designing therapeutic dietary interventions targeting lifestyle-related diseases and non-communicable diseases.

Course Outcomes:

CO01: Students will be able to demonstrate the ability to formulate personalized dietary plans for individuals affected by chronic diseases conditions.

CO02: Students will develop proficiency in menu planning and dietary prescription, for specific non-communicable or lifestyle diseases conditions.

Skills: Develop skills to plan and prepare a Long term therapeutic diet

CO PO Mappings:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO01	1	2	-	1	-	-	1	1	1	-	1
CO02	1	2	-	1	-	-	1	2	1	-	1

Practical

45hrs.

	Diet During Chronic Disease Condition
1	A day's menu for an adult man who have undergone peptic ulcer surgery.
2	A day's menu for an adult woman suffering from peptic ulcer
3	A day's menu for an adult woman who have undergone a colon operation.
4	A day's menu for an adolescent girl who is in post operative conditions
5	A day's menu for an adult man suffering from Chronic renal failure (CKD)
6	A day's menu for an adult man suffering from Tuberculosis
7	A day's menu for an adult man suffering from Cirrhosis
	Diet For Lifestyle Disease Condition or Non-Communicable Diseases
1	A day's menu for overweight adolescent boy
2	A day's menu for a school going obese girl
3	A day's menu for an adult man suffering from IDDM
4	A day's menu for an adult woman suffering from NIDDM
5	A day's menu for a woman (16-38yrs) suffering from Breast Cancer
6	A day's menu for a 50 yr old man suffering from Hypertension
7	A day's menu for a 50 yr old man suffering from CVD

Textbooks & Reference Books:

1. Srilakshmi, V. Dietetics New Age International P. Ltd., New Delhi, 2021.
2. Nutrition and Dietetics by B. Srilakshmi (Latest edition: 2020)
3. Textbook of Clinical Nutrition and Dietetics by P. Vasudevan and L. Sreedhar (Latest edition: 2019)
4. Clinical Nutrition: Enteral and Tube Feeding by John L. Rombeau and Roland G. Phillips (Latest edition: 2018)
5. "Krause's Food & the Nutrition Care Process" by L. Kathleen Mahan and Janice L. Raymond - The most recent edition is the 15th edition, published in 2018.
6. "Nutrition Therapy and Pathophysiology" by Marcia Nelms, Kathryn P. Sucher, and Sara Long Roth - The most recent edition is the 4th edition, published in 2019.
7. "Williams' Basic Nutrition & Diet Therapy" by Staci Nix McIntosh and Sara Long Roth - The most recent edition is the 15th edition, published in 2020.

Evaluation Pattern:

Internal (CA)	External	Total
80	20	100

CA – Regular Lab Work Assessment

Course Objective:

To provide a general understanding of our environment, problems during exploitation of natural resources, the importance of biodiversity and the need for its conservation, pollution and its impacts, and approaches for environment sustainability.

Course Outcomes:

COs	Description
CO1	Understand the over-exploitation of our natural resources and the need for Sustainable development.
CO2	Understand the concept of ecosystem, its structure and function and threats to Ecosystems.
CO3	Understand the concept of bio-diversity, its importance and conservation.
CO4	Classify pollution and its impacts
CO5	Inferring different approaches for attaining environmental sustainability.

CO-PO Mapping

PO/PS O CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	0	0	0	1	1	1	0	1	1	1	1	1	1	0	0
CO2	1	1	0	1	1	1	1	1	2	1	1	1	1	1	1
CO3	1	1	0	1	1	1	1	1	2	1	1	1	1	1	1
CO4	2	2	0	1	1	1	1	1	2	1	1	1	1	1	1
CO5	2	2	1	2	2	2	1	2	2	1	1	1	1	2	2

Syllabus**Unit1**

Multidisciplinary nature of environmental studies. Renewable and non-renewable Naturalresources. Overexploitation and conservation of the following natural resources -- forest,water,food,energy,mineral,andlandresources.Conceptofsustainability,sustainabledevelopment. Concept of three R's (Reduce, Reuse, and Recycle). Concept of zero waste.Needforenvironmentaleducation.

Unit2

Conceptofecosystem.Components,structureandfunctionofanecosystem.Abriefdescription of forest ecosystem and desert ecosystem. Food chain and food web, EcologicalPyramids.BiogeochemicalCycles(examples- Carbon,NitrogenandPhosphorous).EcosystemServices(exampleforest). Threatstoecosystems.Conservationofecosystems.

Unit3

Concept of Biodiversity, hot spots of biodiversity, India as a mega diversity nation, Threats tobiodiversity,

Value of biodiversity, Brief description of economic valuation of biodiversity, Red Data Base and Red data Book, International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Brief description), Conservation of biodiversity.

Unit 4

Pollution of air, acid rain, global warming and climate change, ozone layer depletion, Water pollution, Soil pollution. Industrial and urban solid wastes, Hospital wastes, Hazardous waste, Collection, segregation of solid wastes, Different household disposal methods for degradable solid wastes, Commercial water purification devices for households, Plastic pollution, microplastics and its environmental and health effects. E-waste.

Unit 5

Ecological footprints - brief description of Carbon Footprint and Water Footprint, Linear and Circular resource management, System thinking, Industrial ecosystems, Environmental Impact Assessment (EIA), Environment Management Plan (EMP), Green Technology, Green Business, Green Accounting, Green Buildings, Eco-Labeling, Sustainable (Green) Cities. Role of individuals in the upkeep of environment.

Text Books:

1. Palanisamy P. N., Manikandan P., Geetha A., Manjula R. – Environmental Science, Pearson Education.
2. Harikumar P.N., Susha D. And Manoj Narayanan K. S. – Environment management and human rights. Himalaya Publishing House.
3. Asthana D.K and Meera Asthana – A Textbook of Environmental Studies, S.Chand & Company Pvt Ltd. Ran Nagar, New Delhi -110055.

References:

1. Bala Krishnamoorthy – Environmental management: Text and Cases. PHI Learning Private Limited.
2. Jacob Thomas – Environmental management: Text and Cases. Pearson.
3. Rajagopal R. – Environmental Studies: From crisis to cure. Oxford University Press

Evaluation Pattern

Assessment	Weightage (%)
Midterm	25
Continuous Assessment	25
End Semester Exam	50
Total Marks	100

Pre-requisite: Willingness to learn, communication skills, basic English language skills, knowledge of high school level mathematics.

Course Objective: To help students understand the corporate culture and assist them in improving their group discussion skills, communication skills, listening skills and problem-solving skills.

Course Outcomes

CO1: Soft Skills - To improve inter-personal skills, professional etiquette and leadership skills, vital for arriving at win-win situations in Group Discussions and other team activities.

CO2: Soft Skills - To develop the ability to create better impact in a Group Discussions through examination, participation, perspective-sharing, ideation, listening, brainstorming and consensus.

CO3: Aptitude - To interpret, critically analyze and solve questions in arithmetic and algebra by employing the most suitable methods.

CO4: Aptitude - To analyze, understand and apply suitable methods to solve questions on logical reasoning.

CO5: Verbal - To be able to use vocabulary in the right context and to be competent in spotting grammatical errors and correcting them.

CO6: Verbal - To be able to logically connect words, phrases, sentences and thereby communicate their perspectives/ideas convincingly.

Skills: Communication, etiquette and grooming, inter-personal skills, listening skills, convincing skills, problem-solving skill.

CO-PO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					2	2	2
CO2					2	2	2
CO3							3
CO4							3
CO5						3	3
CO6					3	3	3

Syllabus

Soft Skills

Professional Grooming and Practices: Basics of corporate culture, key pillars of business etiquette – online and offline: socially acceptable ways of behavior, body language, personal hygiene, professional attire and cultural adaptability and managing diversity. Handling pressure, multi-tasking. Being enterprising. Adapting to corporate life: Emotional Management (EQ), Adversity Management, Health consciousness. People skills, Critical Thinking and Problem solving.

Group Discussions: Advantages of group discussions, Types of group discussion and Roles played in a group discussion. Personality traits evaluated in a group discussion. Initiation techniques and maintaining the flow of the discussion, how to perform well in a group discussion. Summarization/ conclusion.

ptitude

Logarithms, Inequalities and Modulus: Basics

Sequence and Series: Basics, AP, GP, HP, and Special Series.

Time and Work: Basics, Pipes & Cistern, and Work Equivalence.

Time, Speed and Distance: Basics, Average Speed, Relative Speed, Boats & Streams, Races and Circular tracks.

Logical Reasoning II: Arrangements, Sequencing, Scheduling, Venn Diagram, Network Diagrams, Binary Logic, and Logical Connectives, Clocks, Calendars, Cubes, Non-Verbal reasoning and Symbol based reasoning.

Verbal Skills

Vocabulary: Help students understand the usage of words in different contexts.

Grammar (Medium Level): Train Students to comprehend the nuances of Grammar and empower them to spot errors in sentences and correct them.

Reading Comprehension (Basics): Introduce students to smart reading techniques and help them understand different tones in comprehension passages.

Reasoning: Enable students to connect words, phrases and sentences logically.

Oral Communication Skills: Aid students in using the gift of the gab to interpret images, do a video synthesis, try a song interpretation or elaborate on a literary quote.

References:

1. Adair. J., (1.986), "Effective Team Building: How to make a winning team", London, U.K: Pan Books.
2. Gulati. S., (2006) "Corporate Soft Skills", New Delhi, India: Rupa & Co.
3. The Hard Truth about Soft Skills, by Amazone Publication.
4. Verbal Skills Activity Book, CIR, AVVP
5. Nova's GRE Prep Course, Jeff Kolby, Scott Thornburg & Kathleen Pierce
6. The BBC and British Council online resources
7. Owl Purdue University online teaching resources
8. www.thegrammarbook.com online teaching resources
9. www.englishpage.com online teaching resources and other useful websites
10. Student Workbook: Quantitative Aptitude & Reasoning, Corporate & Industry Relations, Amrita Vishwa Vidyapeetham.
11. Quantitative Aptitude for All Competitive Examinations, Abhijit Guha.
12. How to Prepare for Quantitative Aptitude for the CAT, Arun Sharma.
13. How to Prepare for Data Interpretation for the CAT, Arun Sharma.
14. How to Prepare for Logical Reasoning for the CAT, Arun Sharma.
15. Quantitative Aptitude for Competitive Examinations, R S Aggarwal.
16. A Modern Approach to Logical Reasoning, R S Aggarwal.
17. A Modern Approach to Verbal & Non-Verbal Reasoning, R S Aggarwal.

Evaluation Pattern

Assessment	Internal	External
Continuous Assessment (CA)* – Soft Skills	30	-
Continuous Assessment (CA)* – Aptitude	10	25
Continuous Assessment (CA)* – Verbal	10	25
Total	50	50

*CA - Can be **presentations, speaking activities and tests.**

LIVE-IN LAB

Semester III

Course Code: 25FSN290

L-T-P – 0-0-3-3

Course Objectives

- Identify and analyse the various challenge indicators present in the village by applying concepts of Human Centered Design and Participatory Rural Appraisal.
- User Need Assessment through Quantitative and Qualitative Measurements
- Designing a solution by integrating Human Centered Design concepts
- Devising proposed intervention strategies for Sustainable Social Change Management

Course Outcome

CO1: Learn ethnographic research and utilise the methodologies to enhance participatory engagement.

CO2: Prioritize challenges and derive constraints using Participatory Rural Appraisal.

CO3: Identify and formulate the research challenges in rural communities.

CO4: Design solutions using human centered approach.

CO-PO Mapping

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO							
CO1		3	2	1	3	2	2
CO2		3	2	1	3	2	2
CO3		3	2	1	3	2	2
CO4		3		1	3	2	2

Syllabus

This initiative is to provide opportunities for students to get involved in coming up with technology solutions for societal problems. The students shall visit villages or rural sites during the vacations (after 4th semester) and if they identify a worthwhile project, they shall register for a 3-credit Live-in-Lab project, in the fifth semester.

Thematic Areas

- Agriculture & Risk Management
- Education & Gender Equality
- Energy & Environment
- Livelihood & Skill Development
- Water & Sanitation
- Health & Hygiene
- Waste Management & Infrastructure

The objectives and the projected outcome of the project will be reviewed and approved by the department chairperson and a faculty assigned as the project guide.

Evaluation Pattern:

Assessment	Marks
Internal (Continuous Evaluation) [75 marks]	
Workshop (Group Participation)	15
Village Visit Assignments & Reports	15
Problem Identification and Assessment	15
Ideation: Defining the Needs, Proposed Designs & Review	20
Poster Presentation	10
External [25 marks]	
Research Paper Submission	25
Total	100
Attendance (To be added separately)	5
Grand Total	105

SEMESTER V

FOOD PRODUCT DEVELOPMENT AND MARKETING

Semester V	Hours of Instruction/ week – 4
Course Code:25FSN301	No. of Credits – 4
L-T-P – 3-1-0-4	Total 60 hrs.

Pre requisite: Product development, consumer view on food products, product testing, sensory evaluation

Course Objectives:

1. Develop new food products to support nutri enterprise.
2. Develop entrepreneurship skills for setting up small scale food industries
3. Understand sustainable packaging and labelling for different food products

Course Outcomes:

CO1: Learn the trends and dimensions in food consumption pattern

CO2: Understand and apply the principles in food product development and design.

CO3: Gain understanding in the development of convenience foods

CO4: Gain knowledge on different steps involved in food testing, evaluation and packaging

CO5: Develop entrepreneurship skills and to plan financial and marketing strategies

Skills:

- Develop skills and process in new food product development.
- Develop skills in Marketing of Food Products.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	-	1	-	2	1	1	2	-
CO2	1	2	1	-	1	-	2	1	1	2	-
CO3	1	2	1	-	1	-	2	1	1	2	-
CO4	1	2	1	-	1	-	2	1	1	2	-
CO5	1	2	1	-	1	-	2	1	1	2	-

Syllabus:

Unit I - Food consumption pattern

10hrs.

Definition, Elements. Food Insecurity, Factors contributing to Food insecurity, Trends in Food Consumption pattern, Factors affecting - Economical, Psychological and Sociological Dimensions of Food Consumption patterns.

Unit II - Introduction to Food Product Development

13hrs.

Principles and Purpose of New Product Development, Strategies and Types of product development, Stages of product development, Factors influencing, Recent trends and challenges, Design of experiments and Specifications.

Unit III – Development of Convenience Foods**13hrs.**

Traditional Foods, Weaning Foods, Convenience Foods- RTE, RTS, Extruded foods, IMF Foods, Special Products, Health foods, Nutritional Supplements, Functional Foods, Nutraceuticals and Designer Foods, Sports Foods, Foods for Defense Services, Space foods, flight foods.

Unit IV - Testing, Evaluation and Packaging of Products**12hrs.**

Standardization, Portion size, Portion Control, Quantity Cooking, ShelfLife Evaluation- Sensory and Microbial Testing of Processed Foods, Nutrient Analysis. Suitable Packaging Materials for Different Foods, SWOT Analysis, labelling information and designing, misbranded foods and loss.

Unit V Financial Management and Marketing of Food Products**12hrs.**

Government and Non government organisations (Training and Finance) for Entrepreneurship Development. Financial Institutions (Central and State Government) banks/Funding Agencies, Financial Accounting Procedures, Book keeping, Market Research, Marketing Strategies, digital marketing, Cost Calculation, Advertising Methods, Product sales, Product License, Legal specifications, Consumer Behavior and Food Acceptance, data sciences.

Related Practical Experience

Industrial Visit

Text Books:

1. Sudhir Gupta (2017) Handbook of Packaging Technology, Engineers India Research Institute, New Delhi
2. Khanaka, S.S., Entrepreneurial Development, S. Chand and Company Ltd, New Delhi, 2016.

Reference Books:

1. Suja, R. Nair (2014) Consumer Behaviour and Marketing Research, 1st Edition, Himalaya Publishers.
2. Hmacfie,(2017) Consumer led Food Product Development, Weedhead Publishing Ltd., UK
3. Fuller, Gordon, W(2015)New Food Product Development, 2nd Edition, CRC Press, Boca Raton, Florida,
4. Schaffner .D,J, Schroder , W.R.(2010)Food Marketing and International Perspectives, Web/McGraw Hill Publication

Evaluation Pattern

Assessment	Internal	External
Periodical 1 &Periodical 2/Mid term	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD SERVICE MANAGEMENT

Semester V
Course Code: 25FSN302
L-T-P – 3-1-0-4

Hours of Instruction/ week – 4
No. of Credits – 4
Total 60 hrs.

Pre requisite: Food service system, food production, menu planning, purchase and storage, institutional food service.

Course Objectives:

1. To create a better understanding on the approaches, tools, management and resources of institutional food service.
2. To make better learning on planning and organizing space, personal and hygiene management.
3. To give knowledge in safety and guidelines in quality control.

Course Outcome:

CO1: Gain experience in principles and functioning of food service system

CO2: Understand about food service flooring and layouts of equipment arrangements.

CO3: Understand about institutional food and financial management.

CO4: Apply knowledge on personnel management, sanitation and hygiene in food service institutions.

CO5: Acquire technical skills on food safety and regulations acts followed in food service.

Skills: Develop skills in bulk food production and institutional food service.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	2	2	-	1	-	1	-	-	1	-
CO2	1	2	2	-	1	-	1	-	-	1	-
CO3	1	2	2	-	1	-	1	-	-	1	-
CO4	1	2	2	-	1	-	1	-	-	1	-
CO5	1	2	2	-	1	-	1	-	-	1	-

Syllabus:

UNIT I - Introduction to Food Service System

12hrs.

Introduction, Types of food service establishment- commercial and non-commercial, Types of food service system- Conventional systems, Commissary system, ready prepared system and assembly service system, Methods of food delivery system. Need based specific units- Dietary, catering, institutional food service.

Menu planning – Definition, types, Standardization of recipe, portion control, Styles of food service, current trends in food service, management information system.

UNIT II - Infrastructure and Equipment in Food Service

12hrs.

Planning and layout of Food Service unit - kitchen space- size and types, work simplification, designing kitchens, work centres in kitchen layout, storage and maintenance of kitchen, storage space-types and planning, service areas- design and planning.

Equipment - Classification, selection, design, installation, operation, purchase and maintenance, factors affecting selection of equipment, electrical and nonelectrical equipment for food storage.

UNIT III – Institutional Food and Financial Management**12hrs.**

Principles of management, Approaches to management, Functions of management, Tools of management, Management of resources.

Definition, application of management Accounts of catering operators, Food purchasing- Different purchasing methods, Buying- Qualities of food buyer and Receiving methods, cost concepts, book keeping and accounting – systems of book keeping, book of account maintenance of account books, balance sheets, inventor budgetary control, costing and budgeting, pricing, financial accounting and accounts information system.

UNIT IV - Personal Management and Hygiene**12hrs.**

Personnel Management: concepts, staff employment, employee benefits, staff training and development, legal aspects of personal management.

Sanitation and safety- Hygiene, Sanitation and Safety in Food Service Institutions: Definition, importance, environmental hygiene and sanitation; hygiene in food handling; personnel hygiene of personnel; importance of pest and rodent control in food services, Accidents in food service establishments, safety procedure, training, Educating, legal responsibilities of food service manager.

UNIT V - Food Safety and Standard Regulations**12hrs.**

FSSAI (Food safety standard authority of India) – Introduction, acts and regulations-FSS Act 2006, FSS Rules 2011, FSS Regulations, Entrepreneurial ship in catering, FOSCOs- licensing and registration of food business, FOSTAC, special responsibilities of food safety, BIS, AGMARK, ISO, Hazard Analysis and Critical Control Point System (HACCP)- Introduction, significance, principles and guidelines involved in HACCP System, education and training.

Reference Books:

1. Mohini Shetty, Institutional food management, New age International Publishers, 2016.
2. Mohini Sethi and Surjet Malhan. (2022). Catering Management, “An Integrated Approach. (4th ed.,). Bangalore : New Age International Pvt Ltd.
3. Suganthi, V and Premakumari, C. (2017). Food Service Management. Chennai: Dipti Press (OPC) Pvt.LTD.
4. West ,BB, Wood “Food service in Institutions” ,Johnwiley & Sons,New York
5. Khan MA “Food service operations”, AVI publishing Company Inc.1987.
6. Sethi and Mahan S.-Catering Management and integrated approach, Johnwiley & Sons,New York .
7. Kotas R and Davis B “food cost control” Billing & Sons Ltd, Great Britian ,1976
8. J.M. Diwan (1997) Catering and food service Management, Common Wealth publishers.
9. Tersel MC and Harger – Profession food preparation , Johnwiley & Sons,New York

Evaluation Pattern

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

PACKAGING AND LABELLING OF FOOD PRODUCTS

Semester V

Course Code: 25FSN303

L-T-P – 2-1-0-3

Hours of Instruction/ week – 3

No. of Credits – 3

Total 45 hrs.

Pre requisite: Packaging methods, packaging materials, Food product labelling

Course Objectives:

1. To relate between packaging design and the chemistry of the food packaged.
2. To give a better understanding on the influence of oxygen in storage materials.
3. To create knowledge on the different types of materials used in food packaging.
4. To give an understanding on the principles of labeling

Course Outcomes:

CO1: Demonstrate knowledge of the material involved in packaging with the chemistry of the food packaged.

CO2: Describe the influence of oxygen in different types of packaging materials.

CO3: Demonstrate the advantages and disadvantages involved with different packaging material.

CO4: Acquire knowledge on the factors and regulations considered while packaging and labelling.

CO5: Gain on basic fundamentals of food regulatory laws used in packaging.

Skills: Develop skills in food packaging based on the chemistry of food and packaging materials used.

CO PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	2	1	-	-	-	1	-	-	2	-
CO2	-	1	1	-	-	-	1	-	-	2	-
CO3	-	1	2	-	-	-	-	-	-	2	-
CO4	-	1	2	-	-	-	-	-	-	2	-
CO5	-	1	2	-	-	-	-	-	-	2	-

Syllabus:

Unit I - Packaging design and chemistry of food products

9 Hrs

Food Packaging- Definition, Principles of packaging, Importance, relationship between Packaging and food, functional requirements for food packaging- preservation and protection, transport and storage, operational, communication, appellative function, persuasive function, informative function, environmental requirements. Integrated food packaging systems- Types, Food packaging and environmental ethics, sustainability in food packaging, packaging design.

Unit II - Oxygen scavenging Packaging

9 Hrs

Active Packaging, oxygen scavengers, moisture control, gas permeability control, ethylene scavengers, odour removers, antimicrobial packaging, carbon dioxide absorbers.

Unit III - Food packaging Materials

9 Hrs

Chemical features of food packaging materials, characteristics, Ceramic packaging materials, metal packaging materials, cellulosic packaging materials, plastic packaging materials, multilayer packaging, testing and analysis.

Unit IV Labeling of Food Products

9 Hrs

Components- Nutritional information, factors to be considered, design and graphics, nutrition facts
Labelling- Purpose, type, regulations, market survey on food labelling

Unit V Regulations

9 Hrs

Laws and regulatory compliances, Understanding Bar codes- Where to Get Barcodes, Creating your own Barcodes, Incorporating Barcodes.

References:

1. Giovanni brunazzi, Salvatore Parisi and Amina Pereno, The importance of packaging design for the chemistry of food products, Springer, 2014.
2. Aaron L. brody, Eugene R. Strupinsky and Lauri R. Kline, Active packaging for food applications, CRC Press LLC, 2001.
3. Luciano piergiovanni and Sara limbo, food packaging materials, springer briefs in molecular science-chemistry of foods, Springer 2016.

Evaluation Pattern

Assessment	Internal	External
Periodical 1 & Periodical 2/Mid term	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD PRODUCT DEVELOPMENT PRACTICAL

Semester V

Course Code: 25FSN381

L-T-P – 0-0-3-1

Hours of Instruction/ week – 3

No. of Credits – 1

Total 45hrs

Pre requisite: Product Development Standardization, Organoleptic Evaluation.

Course Objectives

1. To develop skills in product development
2. To create awareness on the steps involved in costing and sales techniques

Course Outcomes:

CO1: Identify and categorize suitable foods for developing products, preparation of a new food product and Standardization of food products for large scale cooking

CO2: Gain knowledge on marketing techniques and launching the developed products

Skills: Develop Skills for new food product development and standardization

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	3	1	1	3	-	2	2	2	2	2
CO2	3	3	-	-	3	-	2	1	2	2	2

Practical's

45hrs

1. Recognition test for basic tastes
2. Types of sensory evaluation,
3. Exploring novel food processing technologies
4. Cereal and pulse based product development
5. Novel foods product development- jams, squash or syrups
6. Novel foods product development- preserves, candies & toffees
7. Novel foods product development- pickles, ketchup or sauce
8. Novel foods product development -weaning foods and health foods
9. Novel foods product development -instant foods, RTE or RTS
10. Instrumental analysis -colour; viscosity
11. Selection of product, preparation, standardization & quantity cooking
12. Selection of packing material, labelling, cost evaluation and sale
13. market and consumer survey

Text Books:

1. Sudhir Gupta (2007) Handbook of Packaging Technology, Engineers India Research Institute, New Delhi
2. Khanaka, S.S., Entrepreneurial Development, S. Chand and Company Ltd, New Delhi, 2006.

Reference Books:

1. Suja, R. Nair(2014) Consumer Behaviour and Marketing Research, 1st Edition, Himalaya Publishers.
2. Hmacfie,(2007) Consumer led Food Product Development, Weedhead Publishing Ltd., UK
3. Fuller, Gordon, W(2005) New Food Product Development, 2nd Edition, CRC Press, Boca Raton, Florida,
4. Schaffner .D,J, Schroder , W.R.(2010)Food Marketing and International Perspectives, Web/McGraw Hill Publication

Evaluation Pattern:

Internal (CA)	External	Total
80	20	100

*CA – Regular Lab work assessment

FOOD SERVICE MANAGEMENT PRACTICAL

Semester V

Course Code: 25FSN382

L-T-P – 0-0-3-1

Hours of Instruction/ week – 3

No. of Credits – 1

Total 45hrs

Prerequisite: Food service, food production, menu planning, purchase, storage, Institutional food service.

Course Objectives:

1. To make an understanding the approaches, tools, management and resources of institutional food service.
2. To learn planning and organizing space.
3. To learn the principles of food, personal and hygiene management.

Course Outcome:

CO1: Gain experience in principles, designing and functioning of food service and hospital service system.

CO2: Apply knowledge on Family meal & functions menu & service planning

CO3: Acquire technical skills in food service management and hospitality management .

Skills: Develop skills in bulk food production and institutional food service.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	2	-	1	3	-	2	1	-	2	1
CO2	2	2	-	1	3	-	1	1	-	2	1
CO3	2	2	-	1	3	-	1	1	-	2	1

Practical's

30 hrs.

1. Lay out planning for different food service system.
2. Learn to setup different styles of food service
3. Family meal & functions menu & service planning
4. Lay out plan for hospital dietary service
5. Quality standards and control
6. Process of standardization of recipes
7. Portion control: Management of left-over foods.
8. Creating good ambiance in food service (Interior decoration)
9. Informal and formal service styles (Table Service)
10. Traditional food service systems
11. Roles and Responsibilities of front office and house keeping

Reference Books:

1. Mohini Shetty, Institutional food management, New age International Publishers, 2016.
2. West ,BB, Wood “Food service in Institutions” ,Johnwiley & Sons,New York
3. Khan MA “Food service operations”, AVI publishing Company Inc.1987.
4. Sethi and Mahan S.-Catering Management and integrated approach, Johnwiley & Sons,New York .
5. Kotas R and Davis B “food cost control” Billing & Sons Ltd, Great Britian ,1976
6. Dr. B.K. Chakravati, “ A Technical guide to Hotel operation” , Metropolitan, New Delhi India.
7. Earl R. Palan and Judity A. Stadler (1986) Preparing for the food service Industry, AVI -Publishing& co
8. Mickey Warner (1989) Recreational food service Management Van Nostrand Reinhold, Newyork.
9. J.M. Diwan (1997) Catering and food service Management, Common Wealth publishers.
10. Tersel MC and Harger – Profession food preparation , Johnwiley & Sons,New York

Evaluation Pattern

Internal (CA)	External	Total
80	20	100

*CA – Regular Lab work assessment

Pre-requisite: Team Spirit, self-confidence and required knowledge, basic English language skills, knowledge of high school level mathematics.

Course Objective: To help students understand the nuances of leadership, know the importance of working in teams, face challenging situations, crack interviews, improve communication skills and problem-solving skills.

Course Outcomes

CO1: Soft Skills - To acquire the ability to work in teams, present themselves confidently and showcase their knowledge, skills, abilities, interests, practical exposure, strengths and achievements to potential recruiters through a resume, video resume, and personal interview.

CO2: Soft Skills - To have better ability to prepare for facing interviews, analyse interview questions, articulate correct responses and respond appropriately to convince the interviewer of one's right candidature through displaying etiquette, positive attitude and courteous communication.

CO3: Aptitude - To manage time while arriving at appropriate strategies to solve questions in geometry, statistics, probability and combinatorics.

CO4: Aptitude - To analyze, understand and apply suitable methods to solve questions on data analysis and data sufficiency.

CO5: Verbal - To use diction that is less verbose and more refined and to use prior knowledge of grammar to correct/improve sentences.

CO6: Verbal - To understand arguments, analyze arguments and use inductive/deductive reasoning to arrive at conclusions. To be able to generate ideas, structure them logically and express them in a style that is comprehensible to the audience/recipient.

Skills: Communication, teamwork, leadership, facing interviews and problem-solving.

CO-PO Mapping

PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO												
CO1	-	-	-	-	-	-	-	2	3	3	-	3
CO2	-	-	-	-	-	-	-	2	3	3	-	3
CO3	-	3	-	-	-	-	-	-	-	-	-	3
CO4	-	3	-	-	-	-	-	-	-	-	-	3
CO5	-	-	-	-	-	-	-	-	-	3	-	3
CO6	-	-	-	-	-	-	-	-	3	3	-	3

Syllabus

Soft Skills

Team Work: Value of teamwork in organizations, Definition of a team. Why team? Effective team building. Parameters for a good team, roles, empowerment and need for transparent communication, Factors affecting team effectiveness, Personal characteristics of members and its influence on team. Project Management Skills, Collaboration skills.

Leadership: Initiating and managing change, Internal problem solving, Evaluation and co-ordination, Growth and productivity, Importance of Professional Networking.

Facing an interview: Importance of verbal & aptitude competencies, strong foundation in core competencies, industry orientation / knowledge about the organization, resume writing (including cover letter, digital profile and video resume), being professional. Importance of good communication skills, etiquette to be maintained during an interview, appropriate grooming and mannerism.

Aptitude

Geometry: 2D, 3D, Coordinate Geometry, and Heights & Distance.

Permutations & Combinations: Basics, Fundamental Counting Principle, Circular Arrangements, and Derangements.

Probability: Basics, Addition & Multiplication Theorems, Conditional Probability and Bayes' Theorem.

Statistics: Mean, Median, Mode, Range, Variance, Quartile Deviation and Standard Deviation.

Data Interpretation: Tables, Bar Diagrams, Line Graphs, Pie Charts, Caselets, Mixed Varieties, and other forms of data representation.

Data Sufficiency: Introduction, 5 Options Data Sufficiency and 4 Options Data Sufficiency.

Campus recruitment papers: Discussion of previous year question papers of all major recruiters of Amrita Vishwa Vidyapeetham.

Miscellaneous: Interview Puzzles, Calculation Techniques and Time Management Strategies.

Verbal Skills

Vocabulary: Create an awareness of using refined language through idioms and phrasal verbs.

Grammar (Advanced Level): Enable students to improve sentences through a clear understanding of the rules of grammar.

Reasoning Skills: Facilitate the student to tap his reasoning skills through Syllogisms, and critical reasoning arguments.

Reading Comprehension (Advanced): Enlighten students on the different strategies involved in tackling reading comprehension questions.

Public Speaking Skills: Empower students to overcome glossophobia and speak effectively and confidently before an audience.

Writing Skills: Practice closet tests that assess basic knowledge and skills in usage and mechanics of writing such as punctuation, basic grammar and usage, sentence structure and rhetorical skills such as writing strategy, organization, and style. Practice formal written communication through writing emails especially composing job application emails.

References:

1. Adair. J., (1.986), "Effective Team Building: How to make a winning team", London, U.K: Pan Books.
2. Gulati. S., (2006) "Corporate Soft Skills", New Delhi, India: Rupa & Co.
3. The Hard Truth about Soft Skills, by Amazone Publication.
4. Verbal Skills Activity Book, CIR, AVVP
5. Nova's GRE Prep Course, Jeff Kolby, Scott Thornburg & Kathleen Pierce
6. The BBC and British Council online resources
7. Owl Purdue University online teaching resources
8. www.thesgrammarbook.com online teaching resources
9. www.englishpage.com online teaching resources and other useful websites
10. Student Workbook: Quantitative Aptitude & Reasoning, Corporate & Industry Relations, Amrita Vishwa Vidyapeetham.
11. Quantitative Aptitude for All Competitive Examinations, Abhijit Guha.
12. How to Prepare for Quantitative Aptitude for the CAT, Arun Sharma.
13. How to Prepare for Data Interpretation for the CAT, Arun Sharma.
14. How to Prepare for Logical Reasoning for the CAT, Arun Sharma.
15. Quantitative Aptitude for Competitive Examinations, R S Aggarwal.
16. A Modern Approach to Logical Reasoning, R S Aggarwal.
17. A Modern Approach to Verbal & Non-Verbal Reasoning, R S Aggarwal.

Evaluation Pattern

Assessment	Internal	External
Continuous Assessment (CA)* – Soft Skills	30	-
Continuous Assessment (CA)* – Aptitude	10	25
Continuous Assessment (CA)* – Verbal	10	25
Total	50	50

*CA - Can be presentations, speaking activities and test

LIVE-IN-LAB

COURSE CODE:25FSN390

L-T-P-C: 0-0-3-3

Course Objective:

- Proposal writing in order to bring in a detailed project planning, enlist the materials required and propose budget requirement.
- Use the concept of CoDesign to ensure User Participation in the Design Process in order to rightly capture user needs/requirements.
- Building and testing a prototype to ensure that the final design implementation is satisfies the user needs, feasible, affordable, sustainable and efficient.
- Real time project implementation in the village followed by awareness generation and skill training of the users (villagers)

Course Outcome

CO1: Learn co-design methodologies and engage participatorily to finalise a solution

CO2: Understand sustainable social change models and identify change agents in a community.

CO3: Learn Project Management to effectively manage the resources

CO4: Lab scale implementation and validation

CO5. Prototype implementation of the solution

CO-PO Mapping

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO							
CO1	2	3	3		3		3
CO2	2	3	3		3		3
CO3	2	3	3		3		3
CO4	2	3	3		3		3
CO5	2	3	3		3		3

Syllabus

The students shall visit villages or rural sites during the vacations (after 6th semester) and if they identify a worthwhile project, they shall register for a 3-credit Live-in-Lab project, in the fifth semester.

Thematic Areas

- Agriculture & Risk Management
- Education & Gender Equality
- Energy & Environment
- Livelihood & Skill Development
- Water & Sanitation
- Health & Hygiene
- Waste Management & Infrastructure

Evaluation Pattern

Assessment	Marks
Internal (Continuous Evaluation) [63 marks]	
1. Proposed Implementation	2
Presentation Round 1	
2. Proposal Submission + Review	6
3. Co-design	6
i. Village Visit I (Co-Design Field Work Assignments)	4
ii. Presentation of Co- design Assessment	2
4. Prototype Design	14
i. Prototype Design	4
ii. Prototype Submission	8
iii. Sustenance Plan	2
5. Implementation	35
i. Implementation Plan Review	3
ii. Implementation	24
iii. Testing & Evaluation	4
iv. Sustenance Model Implementation	4
External [37 Marks]	
6. Research Paper	18
7. Final Report	15
8. Poster Presentation	4
Total	100

SEMESTER VI
COMMUNITY NUTRITION

Semester VI

Course Code:25FSN311

L-T-P – 3-1-0-4

Hours of Instruction/ week – 4

No. of Credits – 4

Total 60 hrs.

Course Objectives:

1. Understand various nutritional problems prevailing globally and in India communities
2. Gain insight on various nutritional organizations combating malnutrition
3. Apply the principles of supplementary feeding interventions in community

Course Outcomes:

1. Understand the basic concepts of community nutrition in globalized world
2. Gain knowledge on nutritional problems of the community with its nutritional recommendations
3. Learn skills for assessing nutritional status in the community
4. Acquire skills on strategies to combat nutritional problems

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	-	1	1	-	3	1	1	-	-	1
CO2	1	-	1	1	-	-	1	1	-	-	1
CO3	-	-	1	-	-	3	1	1	-	-	1
CO4	-	-	1	1	-	3	1	1	-	-	1

Syllabus:

Unit I –Community Nutrition- An Overview

14 Hrs.

Community nutrition- Definition. Role of nutrition in community development. Methods of improving nutritional quality. Nutritional and infection interrelationship. Present trends and focus on community nutrition.

Unit II –Nutritional Problems of the Community

14 Hrs.

Nutritional Problems- PEM, obesity, vitamin A deficiency diseases, anaemia, iodine deficiency disorders, fluorosis and life style disorders. Malnutrition- Definition, prevalence, causes, consequences. Ecological factors leading to malnutrition. Vicious cycle of malnutrition. Strategies to overcome malnutrition. Nutritional recommendations during nutritional deficiencies, disorders and pandemic. Principles of planning diets during malnourishment. Complementary Nutrition. Role of functional foods in health promotion and disease prevention.

Unit III- Assessment of Nutritional Status

14hrs.

Different methods for assessing nutritional status. Direct methods- Anthropometric assessments, biochemical assessments, clinical observations, dietary assessments. Indirect methods- economic factors, cultural and social factors, ecological variables, vital health statistics and other records.

Unit IV- Strategies to Combat Nutritional Problems

14hrs.

Strategies to mitigate nutritional problems. Food Security and Nutritional security- concept and measurement. Factors affecting food security and nutritional security. Management of food insecurity-Food Fortification and enrichment. Governmental Policies and Programmes - Food Assistance and Food Supplementation Programmes- Public Distribution System (PDS), Food For Work (FFW), Special Nutrition Programme (SNP), School Lunch Programme (SLP), Mid Day Meal Programme (MMP), Balawadi Nutrition Programme (BNP), Integrated Child Development Services (ICDS). Nutrition Education - Importance - Approaches Media and Methods.

Text Books:

1. Textbook of community nutrition, 6 th edition, by dr. Suryatapa das, 2023.
2. Community Nutrition by V Srilakshmi, B;Suganthi , 2022
3. Community Nutrition and Health by Bhavana Sabarwal, 2023
4. Food Nutrition and Community Health, Dr. Vikas Singh & Dr. Gyanendra kumar, 2020
5. Boyle M.A.(2021). Community Nutrition in Action. 8th Edition. Cengage Learning, USA.
6. Steyn N. and Temple N.J. (2016). Community Nutrition for Developing Countries. Athabasca University Press, Canada.

Reference Books:

1. Nutrition- Concepts and Controversies, bySizer F.S. and Whitney E, 15th Edition, 2016, Wadsworth Cengage Learning, USA.
2. Understanding Nutrition, by Whitney E. and Rolfes S.R,11th Edition, 2018, Wadsworth Cengage Learning, USA.

Evaluation Pattern

Assessment	Internal	External
Periodical 1 &Periodical 2/Mid term	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

ANALYTICAL INSTRUMENTATION

Semester VI

Course Code:25FSN312

L-T-P – 2-0-0-2

Hours of Instruction/ week – 2

No. of Credits – 2

Total 30 hrs.

Pre requisite: Basic knowledge on instruments used in food analysis

Course Objectives:

1. To create awareness on different analytical techniques used in food analysis
2. To give an understanding on the principles and applications of various analytical instruments used in food analysis.

Course Outcomes:

CO1: Familiarized to various instrumental techniques in food analysis

CO2: Understand the principles and applications of chromatographic methods

CO3: Familiarize with hyphenated techniques in chromatography

CO4: Gain knowledge in spectroscopic methods used in food analysis

CO5: Understand the principles and applications behind thermal analysis

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	1	-	-	-	-	1	-	-	3	-
CO2	2	1	-	-	-	-	1	-	-	3	-
CO3	2	1	-	-	-	-	1	-	-	3	-
CO4	2	1	-	-	-	-	1	-	-	3	-
CO5	2	1	-	-	-	-	1	-	-	3	-

Syllabus:

Unit I - Introduction to Food Analysis

5hrs.

Need for food analysis, need for Instrumentation in Food Analysis, Criteria for Selecting a Technique, Instrumental Techniques in Food Analysis, Transition of food analysis.

Unit II Chromatographic Techniques

7hrs.

Gas chromatography, Liquid chromatography, Thin Layer Chromatography, High Performance Thin Layer Chromatography – Principles and applications

Unit III Hyphenated Techniques

6hrs.

Gas Chromatography-Mass Spectrometry (GC-MS), Liquid Chromatography-Mass Spectrometry (LC-MS) -
– Principles and applications- Principles and applications.

Unit IV - Spectroscopic Techniques**6hrs.**

Visible Spectroscopy, Atomic-Absorption Spectroscopy (AAS), Inductively Coupled Plasma – Optical Emission Spectrophotometry (ICP- OES/MS), Nuclear Magnetic Resonance Spectroscopy (NMR), Fourier Transform Infrared Spectroscopy (FT-IR) –Principles and applications.

Unit V Thermal Methods of Analysis**6hrs.**

Thermogravimetry, Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC) – principles and applications

Activity

1. Visit to NABL accredited lab.

Text books:

1. Manual in Instrumentation in Food Analysis, IGNOU University
2. Handbook of Analytical Instruments, 3rd edition, McGraw-Hill Education – Europe, ISBN: 9780070604605, R.S. Khandpur, 2015.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 &Periodical 2/Mid term	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD PRODUCT EVALUATION

Semester VI
Course Code:25FSN313
L-T-P – 1-1-0-2

Hours of Instruction/ week – 2
No. of Credits – 2
Total 30 hrs.

Pre requisite: Basic knowledge on food product evaluation

Course Objectives:

1. To give a better knowledge about different techniques for food product development and evaluation
2. To create insights on various methods of evaluating the quality and safety of foods.

Course Outcomes:

CO1: Gain knowledge on the importance of evaluation of food quality
CO2: Interpret the evaluation techniques and tests used in analyzing food quality
CO3: Identify the sensory characteristics of different foods
CO4: Understand the physical, chemical and microscopic methods used in the evaluation of food quality

Skills: Develop skills in food product development and evaluation

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	1	-	-	1	1	-	3	1
CO2	1	3	-	1	-	-	1	1	-	3	1
CO3	1	3	-	1	-	-	1	1	-	3	1
CO4	1	3	-	1	-	-	1	1	-	3	1

Syllabus:

Unit I - Introduction to Food Evaluation Quality

7hrs.

Definition, Objectives and Need for Evaluation of Food Quality

Factors Affecting the Evaluation of Food Quality – Psychological and Physiological

Unit II Methods of Evaluation of Food Quality – Subjective Methods

8hrs.

Sensory Characteristics of Food - Appearance, Colour, Flavour, Taste, Texture and Consistency, Conducting Sensory Tests – Training Panel Members, Testing Laboratory – Preparation of Samples, Techniques of Smelling and Tasting, Testing time, Reasons for Testing Food Quality

Tasting procedures- Chewing, nibbling, slurping, mouth rinsing

Organoleptic Evaluation- Flavour, Colour, Clarity, Viscosity, texture, smelling procedures

Unit III Sensory Tests used for Food Evaluation

8hrs.

Types of Tests, Difference Tests, Rating Tests, Sensitivity Tests, Descriptive Tests, Interpretation of scores, Application of softwares in interpreting scores

Threshold tests- Absolute, Recognition, Differential, Terminal

Discrimination tests- paired comparison, duo trio difference, triangular difference, single sample test, two alternative forced choice test

Descriptive tests- Simple descriptive, Descriptive with rating, Flavour profile, Dilution profile technique

Unit IV - Methods of Evaluation of Food Quality – Objective Methods

7hrs.

Basic Guidelines, Advantages and Disadvantages, Tests Used, Chemical, Nutritional Analysis & Evaluation (Labelling information) Physio-chemical, Microscopic, Physical Method- grading, Instruments used for Evaluation.

Text books:

1. Srilakshmi, B. Second Edition, Food Science, New Age International (P) Limited Publishers, New Delhi. 2023
2. Harry T. Lawless, Hildegarde, Sensory Evaluation of Food Principles and Practices, Second Edition, Springer Science, 2010.
3. Joshi, V.K Sensory Science: Principles and Applications in Food Evaluation, 2016.

Reference books:

1. Huttenwigs, B.J. Food Color and Appearance, Published by Blackie Academic and Professional, London, 2010.
2. Howard R. Beckley, Jacqueline, H. Sensory and Consumer Research in Food Product Design and Development, 2016
3. Bi, Jian, Sensory Discrimination Tests and Measurements: Statistical Principles, Procedures and Tables, 2016.

Evaluation Pattern:

Assessment	Internal	External Semester
Periodical 1 & Periodical 2/Mid term	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

RESEARCH METHODOLOGY AND BIO STATISTICS

Semester VI

Course Code: 25FSN314

L-T-P – 2-2-0-4

Hours of Instruction/ week – 4

No. of Credits – 4

Total 60 hrs.

Course Objectives :

1. Understand different types of research, merits and demerits of each research types
2. Analyse the competence for selecting methods and tools appropriate for carrying out experimental research
3. Develop a research proposal and evaluate statistical methods to assess the outcome of the research

Course Outcomes:

CO1: Understand the purpose, types, designs and hypothesis of research

CO2: Analyse systematic methods for data collection, data processing and data analysis CO3: Design a research proposal in the appropriate scientific style

CO4: Develop skills for scientific research writing based on critical interpretation.

CO5: Interpret the results of statistical analysis of data and summarize data using tabulation and graphs.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	1	-	-	-	1	-	-	-	-	-
CO2	-	1	-	-	-	1	-	-	-	-	-
CO3	-	-	-	-	-	1	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-

Syllabus:

Unit I - Research Types, Designs and Hypothesis

12 Hrs

Research – Types, objectives, approaches and significance. Research process, Criteria of good research, Research design- Types, characteristics and significance. Basic principles of experimental designs. Nutrition Intervention studies – pilot study, randomized controlled trial, nutritional biomarkers. Research hypothesis- Null Hypothesis and Alternative Hypothesis, Type I and Type II Errors. Testing of hypothesis. Characteristics of good hypothesis.

Unit II- Methods of Data Collection and Sampling designs

12 Hrs

Methods of data collection- Primary and secondary data, Selection of appropriate method for data collection.

Sampling designs - Probability sampling *and* Non-probability sampling. Sampling and Non-sampling Errors. Measurement and Scaling techniques- Quantitative and Qualitative Data, Goodness of Measurement Scales.

Unit III- Bio Statistics and Descriptive Methods

12 Hrs

Bio Statistics- Concept and its scope in public health research. Descriptive methods, Measures of central tendency

- Arithmetic mean, median and mode. Measures of dispersion- Range, Mean Deviation and Standard Deviation. Measures of Skewness and Kurtosis. Measures of Relationship- Covariance, Karl Pearson's Coefficient of Correlation and Rank Correlation.

Unit IV- Processing and Analysis of Data

12 Hrs

Processing Operations. Problems in Processing data. Analysis of data- Elements of data analysis, statistical measures in Research- Student's t- test, Analysis of variance- One way ANOVA and two way ANOVA. Duncan's test. Multivariate analysis of variance (MANOVA), Chi-square test and Regression Analysis. Biostatistics with statistical software- MS-Excel, SPSS, Graph pad prism software and other statistical calculators available in web.

Unit V- Interpretation and Scientific Research Writing

12 Hrs

Interpretation- Techniques and Precautions. Preparation of a Research Proposal. Report Writing- steps, types and significance. Mechanics and Precautions for Writing a Research Report. Presentation of research report- Tabulation and organization of data, Graphical presentation of data.

Text Books:

1. Kothari C.R. (2019), Research Methodology: Methods and Techniques 4th Edition, New Age International Publishers, New Delhi.
2. Pounis G. (2018), Analysis in Nutrition Research: Principles of Statistical Methodology and Interpretation of the Results, Academic Press Publishers, USA.

Reference Books:

1. Trochim W., Donnelly J.P. and Arora K., (2015), Research Methods: The Essential Knowledge Base, Cengage Learning. USA.
2. Blaxter L, Hughes C and Tight M (2010), How to Research – 4th edition. McGraw Hill UK.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 & Periodical 2/Mid term	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Seminar, Projects and Reports.

FOOD ANALYSIS PRACTICAL

Semester VI
Course Code:25FSN383
L-T-P – 0-0-3-1

Hours of Instruction/ week – 3
No. of Credits – 1
Total 45 hrs.

Course Objectives:

1. To create learning on the qualitative and quantitative analytical tests in foods.
2. To give a better understanding on the principles of reaction in the identification of nutritional constituents of foods.

Course Outcomes:

CO1: Acquire knowledge on different analytical techniques associated with food samples

CO2: Gain hands on experience in qualitative and quantitative estimations of proximate constituents.

Skills: Acquire skills to quantify proximate nutrients in foods

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	-	3	-	1	2	-	3	-
CO2	2	-	-	-	3	-	1	2	-	3	-

Practical's:

30hrs.

S.No.	List of Experiments
1.	Determination of Moisture content of different food samples
2.	Qualitative analysis of Carbohydrates, Proteins, Fats and Oils in given food samples
3.	Estimation of Total Sugars using Anthrone Method
4.	Estimation of Proteins using Biuret method
5.	Determination of Crude Fat using soxhlet extraction method
6.	Estimation of Minerals- Calcium, Phosphorus and Iron in the food samples using Spectrophotometric Methods
7.	Estimation of Vitamins- Vitamin A and Vitamin C and in the food samples using Spectrophotometric and Dichloroindophenol Titrimetric Methods

Text Books:

1. Sadasivam, S. and Manickam, A. Biochemical Method, 4th Edition, New Age International P. Ltd., Publishers, New Delhi, 2022.
2. Oser, B.L., Harke's Physiological Chemistry XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2011.

Reference Books:

1. Raghuramulu, N., Madhavannair, K. and Kalyana Sundaram, National Institute of Nutrition, 2013, A Manual of Laboratory Techniques, Hyderabad, 500007
2. Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry, William Itinmaon Medical Books, London, 2010

Evaluation Pattern

Internal (CA)	External	Total
80	20	100

*CA – Regular Lab work assessment

SEMESTER VII

PUBLIC HEALTH NUTRITION

Semester VII

Course Code:25FSN401

L-T-P-C 2-2-0-4

Hours of Instruction/ week – 4

No. of Credits – 4

Total 60 hrs.

Course Objectives:

1. Gain insight into the public health problems and their implications
2. Acquire skills in organizing and evaluating nutrition projects in the community
3. Appreciate the national and international contribution towards national development

Course Outcomes:

CO1: Understand the basic concepts of public health nutrition

CO2: Gain knowledge in assessing and evaluating nutritional epidemiological studies

CO3: Design strategies and approaches for managing public health problems

CO4: Gain insight into national and international organizations to combat malnutrition

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	1	-	-	-	1	-	1	-	-	-
CO2	-	1	-	-	-	1	-	2	-	-	-
CO3	-	2	-	-	-	1	-	-	-	-	1
CO4	-	1	-	-	-	-	2	-	-	-	1

Syllabus:

Unit I- Public Health Nutrition- An Overview

14Hrs

Public health nutrition -Concept and importance. Concept of health and disease. Dimensions, determinants and indicators of health. Public health and nutritional issues- Global and Indian perspectives. Health care system in India. Role of public nutritionist in health care delivery.

Unit II- Nutritional Epidemiology

14Hrs

Epidemiology –Concept, approaches, types and significance. Principles of Nutritional Epidemiology. Measurement issues. Epidemiology of communicable and non-communicable diseases. Design and planning of nutritional epidemiological studies- Assessing and evaluating epidemiological studies.

Unit III- Public Health Nutrition - Strategies and Approaches

16Hrs

Global and national public health nutrition approaches. Theories of behaviour change and their application to public health nutrition. Developing public health nutrition strategies in the community. Evaluation of public health interventions and policies. Formative research approaches to develop malnutrition interventions. Nutrition education- principle, methods and significance in maintaining public health nutrition.

Unit-IV: National and International Organizations to Combat Malnutrition 16Hrs

National organizations- ICMR-NIN, ICAR, ICAR, CHEB, CSWB, SSWB, NNMB, CFTRI, DFRL, NFI and NIPCCD. International organizations- FAO, WHO, UNICEF, WFP, CARE, GAIN, AFPRO, CWS, CRS, and World Bank. Economics of Nutrition. Malnutrition and its economic consequences. Food security. Food production and food pricing.

Text Books:

1. Park K. (2021). Textbook Of Preventive And Social Medicine, 26th Edition. Banarsidas Bhanot Publisher, Madhya Pradesh, India.
2. A Text Book of Public Health Nutrition, 2022, by Dr. Archana Prabhat, Ms. Aswini K, Iterative International Publisher IIP.
3. Welch A.A., Kearney J.M., Buttriss J.L. and Lanham S.A. (2017). Public Health Nutrition, 2nd Edition. Wiley, U.K.

Reference Books:

1. Stein N. (2014). Public Health Nutrition- Principles and Practice in Community and Global Health. Jones and Bartlett Learning, LLC Publishers, U.S.A.
2. Gibney M.J., Margetts B.M., Kearney J.M., Arab L. (2015). Public Health Nutrition. John Wiley and Sons, New York.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Seminar, Projects and Reports.

NUTRACEUTICALS AND FUNCTIONAL FOODS

Semester VII

Course Code:25FSN402

L-T-P – 3-1-0-4

Hours of Instruction/ week – 4

No. of Credits – 4

Total 60 hrs.

Pre- requisite: Nutraceuticals, bioactive components, dietary supplements, genetically modified foods

Course Objectives:

1. To develop comprehensive understanding of different nutraceuticals and Functional foods, and understand the phytochemical components its potentials and management on health and diseases.
2. Understanding the molecular level interaction between nutrients and other dietary bioactive with human genome and be acquainted with the applications of nutrigenomics in wellness and disease management.

Course Outcomes:

CO1: Understand the basic concepts of nutraceuticals and functional foods.

CO2: Acquire knowledge on the bioactive carbohydrates, peptides and lipids

CO3: Gain knowledge on the prebiotics, probiotics, synbiotics and postbiotics

CO4: Comprehend the significance of nutraceuticals on human health.

CO5: Apply good manufacturing practices and safety issues in functional food industries

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	1	-	-	-	-	2	2	2	-	-
CO2	2	2	-	-	-	-	2	2	2	-	-
CO3	2	2	-	-	-	-	2	2	2	-	-
CO4	2	2	-	-	-	-	2	2	2	-	-
CO5	2	2	-	-	-	-	2	2	2	-	-

Syllabus:

Unit I - Nutraceuticals and Functional Foods

12hrs

Nutraceuticals- definition and classification. Functional foods: Types- Cereal and cereal products; Milk and milk products; Meat, poultry and sea foods; nuts and oilseeds, Functional fruits and vegetables; Herbs and spices; Beverages. Designer foods. Market demand for nutraceuticals and functional foods. Role of Nutraceuticals in Maternal Nutrition, Medical Foods and Infant Formulas.

Unit II- Bioactive carbohydrates, peptides, lipids

12hrs Sources and biological

activities of bioactive carbohydrates, peptides, lipids. Bioactive carbohydrates from plants, animal products, microorganisms. Biological roles of bioactive carbohydrates- antioxidant, immunomodulatory, antitumor, anti-diabetic, antimicrobial. Sources of bioactive peptides- from meat, dairy, collagen, egg, plant, marine and fungi. Fats and Oils as sources of bioactive molecules.

Unit III- Prebiotics, Probiotics, Synbiotics and Postbiotics

12hrs

Prebiotics, probiotics, synbiotics and postbiotics- concept, functions, mechanism of action. Clinical applications of prebiotics, probiotics and synbiotics: gastrointestinal system, respiratory system, cardiovascular system, urinary system, reproductive system, immune system.

Unit IV - Role of Nutraceuticals in Health and Disease

12hrs

Concept of dietary supplements, FOSHU foods – concepts, regulatory aspects Food component – approved health claims, labeling considerations for functional ingredients, Permissible and impermissible functional claims, Role of biotechnology in the development of functional foods.

Unit V -Good Manufacturing Practices and Safety Issues in Functional Food Industries 12hrs

HACCP in functional food industries. Product specifications and conformance. Equipment's and maintenance. Safety assessment: nutritional and toxicological. Market of functional foods- Challenges for Functional food delivery, Customer and manufacturer issues- product information and customer awareness. Factors affecting consumer interest.

Text Books:

1. Handbook of Nutraceuticals and Functional Foods, Robert E.C. Wildman, Richard S. Bruno, Taylor and Francis , CRC Publications, 2020
2. Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahman, Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2015.
3. Srilakshmi, B. Second Edition, Food Science, New Age International (P) Limited Publishers, New Delhi, 2017
4. Simopoulos, A.P. and Ordovas, K.J.M., 2004, Nutrigenetics and Nutrigenomics, Vol. 93, Karger, Switzerland.

Reference Books:

1. Aluko, Rotimi, Functional Foods and Nutraceuticals, Springer-Verlag New York Inc., 2012
2. Satinder Kaur Brar, Surinder Kaur and Gurpreet Singh Dhillon, Nutraceuticals Functional Foods, 2014.
3. Functional Foods and Nutraceuticals,
https://www.researchgate.net/publication/343982518_PREFACE_Functional_Foods_and_Nutraceuticals
4. Watson, David, H., 2013, Performance Functional Foods, CRC Press, Wood Head Publishing Ltd., England
5. Tamine, A., 2015, Probiotic Dairy Products, Blackwell Publishing Ltd., UK
6. Narasinga Rao, B.S., 2015, Nutrition Research in India – A Country Report, Published by INSA, New Delhi.
7. Webb, G.P., 2016, Dietary Supplementations and Functional Foods, Blackwell Publishing Ltd., New York.
8. Tai, E.S. and Gillies, P.J., 2007, Nutrigenomics – Opportunities in Asia, Karger, Singapore. 2013.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD AND NUTRITION RESEARCH TECHNIQUES

Semester VII

Course Code: 25FSN403

L-T-P – 3-1-0-4

Hours of Instruction/ week – 4

No. of Credits – 4

Total 60 hrs.

Course Objectives:

1. Acquire knowledge on trends in food and nutritional research
2. Understand research in novel food product development and its significance in health promotion and disease prevention
3. Gain scientific knowledge on growth, metabolic and nitrogen balance studies in animals and human trials

Course Outcomes:

CO1: Understand the basic concepts of food and nutritional research and ethical issues

CO2: Analyse different innovative Food products and its significance in human health

CO3: Acquire knowledge on significance of animals models in nutritional research and growth studies in animal models

CO4: Design growth, metabolic and nitrogen balance research using human models.

CO5: Apply tools and techniques in manuscript writing and publication ethics

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	-	-	3	-	-	-	-	1	-	-
CO2	-	-	-	-	-	-	-	-	-	-	1
CO3	-	-	-	1	-	-	-	-	-	-	2
CO4	-	-	-	3	-	-	-	-	-	-	2
CO5	-	-	-	3	-	-	-	-	-	-	2

Syllabus:

Unit I - Food and Nutritional Research and Ethical Issues 12Hrs

Trends in food and nutrition research- Global and Indian perspective, Thrust areas in food and nutritional research. Food and Nutritional research- In vitro and in vivo studies. Nutrition intervention studies- principles, merits and demerits. Ethical issues in nutritional research- Rights of the research participant, Physical and psychological risks, Ethical issues regarding copyright. Human and animal ethical committees.

Unit II- Research in Novel Food Product Development 12Hrs

Food products- the basis of innovation- 3D food printing, cultured meats, food nano materials, nano tooled bug boosters. Measures of food products success and failure. Product development process- the basis for success. Prototype. Developing an innovative strategy. Managing and improving product development process. Case studies- product development in food systems. Patent in food sectors. Significance of research in food products development in health promotion and disease prevention.

Unit III- Growth Studies in Animal Models

12Hrs

Animal models in nutrition research, Need for extrapolation research in animal models. Maintenance of animal laboratory, maintenance of records. Growth and development of rats- role of different protein levels in diet formulation, feeding techniques, Biological assays with animal models- metabolic and nitrogen balance studies.

Unit IV- Biological Assays in Human Trials

12Hrs

Research studies among humans-Principles and objectives. Growth studies among infants, children and adolescents-Effect of supplementation of different protein sources in managing nutritional status. Metabolic and nitrogen balance studies among children, adolescents and adults and interpretation of results. Nutritional research in vulnerable sector of society and innovation in dietary supplement delivery.

Unit V Manuscript Writing and Publication Ethics

12Hrs

Manuscript writing-tools and techniques. Manuscript preparation- steps. Guidelines for preparing for publication- Scientific papers writing. Indexed journals-types and its significance. Publication ethics. Perspectives of plagiarism- techniques to avoid plagiarism. Internet plagiarism and Plagiarism detection software- Turnitin, Copyleaks, Plagiarism Checker, Dupli Checker, PlagScan, Pro Writing Aid and White Smoke.

Text Books:

1. Bamiji M.S., Rao P.R. and Reddy V. (2017), Text Book of Human Nutrition Oxford and IBFI Publishing Co. Pvt. Ltd., New Delhi.
2. Gopaldas T. and Seshadri S.(2015), Nutrition, Monitoring and assessment, Oxford University Press, New Delhi .

Reference Books:

1. Whitney E.N, and Rolfes S.R. (2015). Understanding Nutrition, 11th Edition, Chap. 6 and Appendix `J'. Measures of Protein Quality – West Wadsworth.
2. Pyke R.L. and Brown. M.L. (2019). Nutrition an Integrated approach, Chapter 15, Wiley eastern Publications, New York.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Seminar, Projects and Reports.

TECHNIQUES OF EXPERIMENTAL NUTRITION

Semester VII

Hours of Instruction/ week – 3

Course Code: 25FSN481

No. of Credits – 2

L-T-P – 0-0-3-2

Total 30 hrs.

Course Objectives:

1. Understand the chemical composition of different foods using colorimetric and spectrophotometric and chromatography techniques
2. Impart knowledge on qualitative and quantitative estimation of nutrients, antioxidants and phytochemicals in different food samples

Course Outcomes:

CO1: Acquire knowledge on different analytical techniques associated with food samples

CO2: Gain hands on experience in qualitative and quantitative estimations of proximate constituents, antioxidants and phytochemicals in different food samples.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	-	-	-	-	-	-	-	-	2	-
CO2	-	-	-	-	-	-	-	-	-	2	-

Practicals:

S.No.	List of Experiments
1.	Instrumentation techniques – Brookfield Viscometer, Abbe's Refractometer, pH meter, Colorimeter, Spectrophotometer and chromatography-principle and working.
2.	Determination of Moisture content using hot air oven drying technique
3.	Qualitative analysis of Carbohydrates, Proteins, Fats and Oils in given food samples
4.	Estimation of Total Sugars using Anthrone Method
5.	Determination of reducing sugars using Dinitrosalicylic acid (DNSA) Method
6.	Estimation of Dietary Fiber using AOAC Method

7.	Estimation of Proteins using Biuret / Lowry method
8.	Determination of Amino acids by Sorensen's Formal Titration
9.	Determination of Crude Fat using soxhlet extraction method
10.	Determination of Total ash content using dry ashing and wet ashing methods
11.	Estimation of Minerals- Calcium, Phosphorus and Iron in the food samples using Spectrophotometric Methods
12.	Estimation of Vitamins- Vitamin A and Vitamin C and in the food samples using Spectrophotometric and Dichloroindophenol Titrimetric Methods
13.	Determination of Phytochemicals - Phytates, Oxalates and Tannins using AOAC Methods
14.	Estimation of total antioxidants using FRAP (ferric reducing-antioxidant power) assay- Spectrophotometric Technique.

Text Books:

1. Nielsen S.S. (2015), Introduction to the chemical analysis of foods, CBS Publishers and Distributors, Pvt. Ltd, New York.
2. Ranganna S. (2019). Handbook of analysis and quality control for fruits and vegetables, 2nd Edition. Tata McGraw Hill, USA.

Reference Books:

1. Suzanne Nielsen S.S. (2017). Food Analysis Laboratory Manual. Springer, USA.

Evaluation Pattern:

Internal (CA)	External	Total
80	20	100

*CA – Regular Lab work assessment

SEMESTER VIII
NUTRITION IN HEALTH AND FITNESS

Semester VIII

Hours of Instruction/ week – 3

Course Code: 25FSN411

No. of Credits – 3

L-T-P – 3-1-0-4

Total 45 hrs.

Course Objectives:

1. Understand the basic concepts of health, physical activity and physical fitness
2. Comprehend energy metabolism in physical activity and weight management
3. Gain knowledge on significance of nutrition in health and fitness

Course Outcomes:

CO1: Understand the components, evaluation and health benefits of physical fitness

CO2: Gain scientific knowledge on energy metabolism during physical activity

CO3: Acquire knowledge on Nutritional recommendations during exercises and ergogenic aids

CO4: Analyse biological effect of physical fitness on health status and managing diseases.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	1	-	-	-	-	2	-	2	-	-
CO2	-	1	-	-	-	-	1	-	1	-	-
CO3	1	1	-	-	-	-	2	-	3	-	-
CO4	1	2	-	-	-	-	3	-	3	-	1

Syllabus:

Unit I- Health, Physical Activity and Physical Fitness

11Hrs

Health- definition and dimensions. Spectrum of health. Physical activity- Concept, types, health benefits and recommendations. Exercise- concept and types, Physical Fitness- Components, principles and evaluation of physical fitness, FITT Principles. Energy Systems and fuels to support physical activity.

Unit II- Energy Metabolism in Physical Activity and Weight Management

11Hrs

Energy homeostasis in the cell. Integration of carbohydrate, protein and fat metabolism. Muscle ATP production during exercise- Aerobic and Anaerobic metabolic pathways. Energy requirements based on physical activity. Components and assessment of energy expenditure. The Fed-Fast cycle. Regulation of energy balance and body

weight. Health implications of altering body weight. Interrelation between Physical activity and weight management.

Unit III- Nutritional Recommendation and Physical Fitness

11Hrs

Nutritional requirements during exercises- Carbohydrate, protein, fat, vitamins and minerals recommendations. Fluids and electrolytes to support physical activity. Diets for physically active people. Ergogenic aids- nutritive and non-nutritive aids, merits and demerits of ergogenic aids.

Unit-IV: Physical Activity and Disease Prevention

12 Hrs

Physiological and biological effect of physical fitness on health status and vital systems. Role of physical activity and exercise on prevention and management of cardiovascular diseases, obesity, cancer, diabetes, healthy aging, musculoskeletal health, cognitive health and degenerative diseases.

Text Books:

1. A Jackson A.W., Morrow J.R., Dishman R.K., Hill D. (2015). Physical Activity for Health and Fitness. Human Kinetics, USA.
2. Gropper S.S., Jack L. Smith J.L., Carr T.P. (2018). Advanced Nutrition and Human Metabolism 7th Edition. Cengage Learning, USA.

Reference Books:

1. Whitney E.N, and Rolfes S.R. (2015). Understanding Nutrition, 11th Edition, Chap. 6 and Appendix 'J'. Measures of Protein Quality – West Wadsworth.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Seminar, Projects and Reports.

PROFESSIONAL ELECTIVES

ELECTIVES A (SEMESTER III & VII)

FOOD HYGIENE AND SANITATION

Semester: III & VII

Course Code: 25FSN331

L-T-P – 3-0-0-3

Hours of Instruction/ week – 3

No. of Credits – 3

Total 45 hrs.

Pre requisite: Food safety, Hygiene, WASH

Course Objectives:

1. Understand the basics of food hygiene
2. Understand the concepts of safe and effective sanitation practices
3. Understand the sanitary aspects of water.

Course Outcome:

CO1: Understand the food hygiene and sanitation measures to control the spread of microorganisms.

CO2: Interpret the sanitary aspects of water supply from its source to purification

CO3: Apply the various cleaning practices involved in sanitation

CO4: Acquire the basic fundamentals of sanitation practices followed in food industry

CO5: Gain knowledge on the safety measurements and precautions taken for insects/pest control.

Skills: Develop skills in maintaining sanitary practices in food industry

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	-	-	-	1	1	1	-	-	1	-
CO2	3	-	-	-	1	1	1	-	-	1	-
CO3	3	-	-	-	1	1	1	-	-	1	-
CO4	3	-	-	-	1	1	1	-	-	1	-
CO5	3	-	-	-	1	1	1	-	-	1	-

Syllabus:

Unit I - Food hygiene

9hrs.

General principle of food hygiene. Hygiene in rural and urban areas in relation to food preparation, personal hygiene and food handling habits. Sanitary aspects of building and equipment, Plant layout and design.

Unit II - Sanitary aspects of water supply**9hrs.**

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 III - Cleaning practices**9hrs.**

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 IV - Sanitation practices**9hrs.**

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.

Unit V - Safe and effective insect and pest control**9hrs.**

Extraneous materials in foods, Physical and chemical methods of control of pests and insects. Effective control of micro-organisms: microorganisms important in food sanitation, micro-organisms as indicator of sanitary quality.

References:

1. Guide to Improve Food Hygiene - Gaston and Tiffney, 3rd Edition, 2021
2. Practical Food Microbiology & Technology - Harry H. Weiser, Mountney, J. and Gord, W.W., 2021
3. Principles of Food Sanitation - Marriott and Norman, G. 6th edition 2018

Evaluation Pattern

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

ADOLESCENCE HEALTH AND LIFESTYLE

Semester: III & VII
Course Code:25FSN332
L-T-P – 3-0-0-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs

Pre-requisite: Health, Lifestyle changes, adolescence needs.

Course Objectives:

This course will provide better understanding of significance in adolescent's health and nutrition and relationship between lifestyle practices and health outcomes.

Course Outcome:

CO1: Expertise stages of adolescence, significance of maintenance of health and nutrition.

CO2: Gained information on the impact of long-term good lifestyle practices on health.

CO3: Knowledge on promotion of good eating habits, physical activity and resting pattern.

CO4: Acquire Knowledge on practicing good personal habits and hygiene.

CO5: Gain knowledge on role of lifestyle practices on mental health.

Skills: Develop skills to overcome lifestyle changes during adolescence

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	-	-	-	-	-	2	-	1	-	1
CO2	2	2	-	-	-	-	2	-	1	-	1
CO3	1	1	-	-	-	-	1	-	2	-	1
CO4	-	-	-	-	-	-	1	-	1	-	-
CO5	-	-	-	-	-	-	1	-	1	-	-

Syllabus:

Unit 1 – Introduction to Adolescent Health and Lifestyle

9hrs.

Significance of Adolescent Health- stages of adolescence, physical, social, emotional, spiritual and intellectual well-being, sedentary lifestyle, reproductive health and factors influencing, integration of knowledge and skills to develop a healthy lifestyle plans, parent's adolescence communication

Unit II – Promotion of Good Eating Habits

9hrs.

Food choices- Skipping Breakfast- Factors, impact on health, Measures to overcome Junk Food Consumption

- Factors, impact on health, Measures to overcome Eating White Products- Factors, impact on health, Measures to overcome Water and Fluid intake- Significance on health.

Unit III – Resting pattern and physical activity

9hrs.

Postures – Ergonomics, Good and Bad postures, Advantage and Disadvantages

Degenerative Disc Disease – Causes, types, Consequences to human health

Sleeping Pattern – Types, advantages and disadvantages, circadian rhythm, nocturnal habits, consequences to human health,

Physical activity, obesity and weight management- Types and significance, weight management,

Unit IV – Personal habits and hygiene

9hrs.

Personal Habits:

Alcohol addiction, Smoking, Substance Abuse, Electronic addiction - Factors, symptoms, types health impact, measures to overcome

Personal hygiene:

General hygiene, menstrual hygiene, dental hygiene

Unit V – Supporting Mental Health

9hrs.

Stress- Causes, types, signs and symptoms, coping with emotions and stress, impact of Stress on adolescent health

Depression and Suicidal tendency- Causes and impact of Depression on adolescent health

Peer pressure- Causes, types and impact of peer pressure and ways to overcome on adolescent health

Procrastination- Causes, types and impact of peer pressure and ways to overcome on adolescent health

Violence – Types, causes and effects, rehabilitation measures

Text Books:

1. An Introduction to Lifestyle Management: Facilitator's Handbook, Dr.Anja Morris-Paxton, 2019
2. Food Science- Srilakshmi, Prosper Montague Publishing Group Ltd., Hamlyn, London. 2015.
3. Internet Addiction: The Ultimate Guide for How to Overcome An Internet Addiction For Life (Gaming Addiction, Video Game, TV, RPG, Role-Playing, Treatment, Computer) Paperback Caesar Lincoln, 2014.
4. Food & Nutrition- Swaminathan (1995), The Bangalore Printing & publishing co ltd., Vol I, Second Edition, Bangalore
5. The New Rules of Posture: How to Sit, Stand, and Move in the Modern World, Mary Bond, 2006
6. Stress Management: A Wellness Approach First Edition by Nanette E. Tummers, ISBN-13: 978-1450431668

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

NUTRITION FOR ATHLETES

Semester : III & VII
Course Code: 25FSN333
L-T-P – 3-0-0-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs.

Pre-requisite: Health and fitness knowledge, practice.

Course Objectives:

1. Understand the dietary recommendations for athletes
2. Acquire knowledge on dietary supplements & ergogenic aids for athletes
3. Gain scientific knowledge on medical nutrition therapy for nutritional disorders among athletes

Course Outcomes:

CO1: Understand the Nutritional Requirement for Athletes

CO2: Gain knowledge on the Nutrition for Special groups and Sports injuries

CO3: Acquire knowledge on significance dietary supplements & ergogenic aids for athletes

CO4: Gain scientific knowledge athletes with nutrition related disorders

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO3	PSO 4
CO1	1	-	-	-	-	-	-	1	1	-	1
CO2	1	-	-	-	-	-	-	1	-	-	-
CO3	1	2	-	-	-	-	-	1	1	-	2
CO4	1	-	-	-	-	-	-	1	2	-	1

Syllabus:

Unit I- Athletes and their Nutritional Requirement

11 Hrs

Athletics- Definition, classification. National and international organizations. Athletics vs nutrition.

Children and adolescent athletes- Growth and development, Nutritional issues commonly faced; Eating habits and addiction; Nutritional requirements for growth and training.

Female athletes- Vulnerability to nutrition assault and insufficiency; Differences in fuel or nutrient utilisation among female athletes; Female athletic triad (FAT) including eating disorder, menstrual irregularity and poor bone mineral density; Dietary guidelines and suggestions for FAT.

Male Athletes -Dietary recommendations for male athletes.

Vegetarian athletes- Classification; Nutritional status and dietary considerations; Nutritional gaps currently identified and suitable dietary modification for fueling during training, competitions and traveling.

Unit II- Nutrition for Special groups and Sports injuries

11Hrs

The Paralympic Athlete- Athletes with physical or intellectual impairments. Eating difficulties and behaviours observed in some athletes with impairments. Paralympic athletes and nutritional demands- Dietary intakes and potential issues. Sport injury and rehabilitation- Type of injury and rehabilitation required, Physiological and metabolic changes during injury and rehabilitation. Eating habits commonly followed during an injury. Overweight among injured athletes. Role of nutrition and dietary guidelines in recovery from an injury.

Unit III- Dietary supplements & Ergogenic Aids for Athletes

11Hrs

Dietary supplement for athletes. Significance of nutritional supplements complementing nutrient-dense diets. Macronutrient Supplements. Protein supplements- Whey, casein, egg albumen, soy protein, pea protein & other vegan proteins, protein bars, protein shakes, amino acid supplements. Carbohydrate Supplements- Carbo loading, Sports Drinks, Bars and Gels. Fat supplements- Omega fatty acids and fish oils. Vitamin, minerals and antioxidants supplements.

Ergogenic aids for Athletes- Definition and Classifications. Metabolite and Botanical Ergogenic Supplements- Wheat germ oil, beetroot, green tea extract, phytosterols, bio flavonoids, herbal testosterone-booster, beta-alanine.

Unit IV- Athletes with Nutrition related disorders

12Hrs

Nutritional disorders among athletes- Diabetes, Cardiovascular disease- Problems of athletes with type 1 diabetes and cardiovascular diseases. Physical activity prescription for athletes with type 1 diabetes and cardiovascular disease. Acute effects of exercise in athletes with Type 1 diabetes and cardiovascular disease; Medical nutrition therapy for athletes with type-1 diabetes and cardiovascular disease. Athletes with gastrointestinal disorders, osteoporosis, anaemia, food related adverse reactions (FRAR). Medical nutrition therapy during nutritional disorders.

Text Books:

1. Mcardle W. D. (2018). Sports and Exercise Nutrition, 5th Edition, Lippincott Williams and Wilkins, North America.
2. Burke L. (Author), Deakin V. (2015). Clinical Sports Nutrition. McGraw Hill, Australia.

Reference Books:

1. McGinnis P.M. (2020). Biomechanics of Sport and Exercise. 4th Edition Human Kinetics, USA.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

ELECTIVES B (SEMESTER IV & VI)

HOME SCALE PRESERVATION OF FOODS

Semester: IV & VI
Course Code: 25FSN341
L-T-P – 3-0-0-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs.

Pre-requisite: Food processing, preservation, additives, preservatives

Course Objectives:

1. To give an understanding on the methods of home scale food preservation
2. To relate to preservation on sugar, salt, drying and chemicals preservative
3. Learnt the importance of moisture removal and fermentation in home scale preservation

Course Outcomes:

CO1: Gain expertise on the preservation methods of foods.

CO2: Enhance the knowledge related to sugar preservation methods

CO3: Understand the preservation method using different drying methods

CO4: Gain knowledge on the chemical and salt preservation methods

CO5: Empower on the different fermentation methods and fermented products

Skills: Develop skills in food processing and preservation at home scale level

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	-	1	-	-	-	1	1	1	1	-
CO2	1	-	1	-	-	-	1	1	1	1	-
CO3	1	-	1	-	-	-	1	1	1	1	-
CO4	1	-	1	-	-	-	1	1	1	1	-
CO5	1	-	1	-	-	-	1	1	1	1	-

Syllabus:

Unit 1- Introduction to Food Preservation

9hrs.

Basic Principles of Food Preservation, Types of Spoilage, Importance of Food Preservation Different Methods of Food Preservation. Management of surplus foods.

Unit II- Preservation by using Sugar

9hrs.

Sugar concentrates, Preparation of Jam, Jelly, Marmalades, Preserves, Candied, Glazed, Crystallized Fruits, FPO Specification, Problems Encountered, Spoilages

Unit III - Preservation by Removal of Moisture**9hrs.**

Sun drying Drying, Dehydration, Method of Drying, Preparation of Vegetable Vathals - Ladies Finger, Brinjal, Beans, Cluster Beans, Preparation of Vadams – Rice vadam, Sago Vadam, Rice Flakes Vadam, Tomoto Vadam

Unit IV-Preservation by using Chemicals and Salts**9hrs.**

Chemical Preservatives – Definition, Types of Preservatives, Preparation and Preservation of Fruit Juices, picking – Principles Involved, Process, Types
Preparation of Various Types of Pickles – Lime, Mango, Ginger, Capsicum, Mixed Vegetables, Brinjal, Onion, Garlic

Unit V- Fermentation**9hrs.**

Definition, Types of Fermentation, Common Fermented Foods – Cheese Making, Dokhla, Wine

Text books:

1. Srilakshmi, B.(2023) Food Science, 9th edition, New Age International (P) Ltd., New Delhi,
2. Adams, M.R. and Moss, M.O. (2005) Food Microbiology, New Age International (P) Ltd., New Delhi,.
3. Usha Chandrasekhar, (2002) Food Science and Applications in Indian Cookery, Phoenix Publishing House Pvt. Ltd., New Delhi,.

Reference Books:

1. Fellows, P. (2000) Food Processing Technology, Principles and Practice, 2nd Edition, CRC Press, Woodland Publishing Ltd., Cambridge, England.
2. Sommers, C.H. and Xveteng Fan, (2006) Food Irradiation Research and Technology, Blackwell Publishing, 2006.
3. Swaminathan, M. Food Science, Chemistry and Experimental Foods, Bappco Publishers, 2013.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

BASICS OF FOOD ENGINEERING

Semester: IV & VI

Code: 25FSN342

L-T-P – 3-0-0-3

Hours of Instruction/ week –3

No. of Credits – 3

Total 45 hrs.

Course Objectives:

1. Understand the basic principles of food engineering
2. Comprehend the types and properties of Refrigeration systems
3. Gain knowledge on processing equipment and maintenance of processing equipment

Course Outcomes:

- CO1: Understand the significance of food engineering and its principles
CO2: Acquire knowledge on steam generation, utilization and evaporation
CO3: Gain knowledge on refrigeration and freezing in food industry
CO4: Design plant location and equipment layout for establishing a food industry

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO3	PSO 4
CO1	-	-	1	-	-	-	-	-	-	1	-
CO2	-	-	1	-	-	-	-	-	-	1	-
CO3	-	-	1	-	-	-	-	-	-	3	-
CO4	-	-	1	-	-	-	-	-	-	3	-

Syllabus

Unit I- Food Engineering- An Overview

11 Hrs

Food Engineering -Historical background. Food Engineering as a distinct discipline. Basic food engineering principles - physical, thermal, aerodynamic, mechanical, optical and electromagnetic properties.

Unit II- Steam Generation, Utilization and Evaporation

11 Hrs

Properties of steam. Steam tables and their application. Boilers operation. Maintenance of boilers. Utilization of steam in food processing. Pressure vessels. Evaporators-Types, principles and equipment. Vapour compression evaporation systems.

Unit III- Refrigeration and Freezing in Food Industry

11 Hrs

Refrigerator- parts and functions. Classification of refrigerants. Refrigeration Cycle. Refrigerator Load. Condenser, Evaporator and compressor. Application of refrigeration in food processing. Cryogenic Freezing and Individual Quick Freezing (IQF).

Unit IV- Plant Designs, Location and Equipment Layout

12 Hrs

Plant designs- design and construction of building, functionality of the building, design and fabrication equipment. Plant location. Cost benefit analysis. Food process economics. Plant layout. Factors to be considered for location and layout of food plants. Regulatory requirements of food industries.

Text Books:

1. C. and S. Padma Ishwarya S.P. (2019). Essentials and Applications of Food Engineering. CRC Press, USA.
2. Rao D.G. (2018). Fundamentals of Food Engineering. Prentice Hall India Private Limited, New Delhi.

Reference Books:

1. Toledo R.T. 2020. Fundamentals of Food Process Engineering 3rd Edition. CRC Press, USA.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Seminar, Projects and Reports.

CAREER OPPORTUNITIES IN FOOD SCIENCE AND NUTRITION

Semester: IV & VI
Course Code: 25FSN343
L-T-P – 3-0-0-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs.

Pre requisite: Biological sciences, food science, dietetics, community nutrition, food industry

Course Objectives:

1. To extend higher learning opportunities for UG Food Science and Nutrition graduates.
2. To make better understanding on various career opportunities pertaining to graduates in UG Food Science and Nutrition.
3. To build capacity and Learning skill for competitive examination opening into government and non-government sectors

Course Outcome:

CO1: Awareness built on the preparation for higher learning opportunities

CO2: Building appropriate skills and capacity to open careers in various hospital sector.

CO3: Gain knowledge on the suitable skills for career opportunities in government sector and community

CO4: Develop skills for career opportunities in food and entrepreneur sector

CO5: Building knowledge and skills for the competitive exam preparations.

Skills: Strengthen technical and develop exam preparedness skills

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	-	-	1	-	3	3	-	-	2	-
CO2	-	-	-	1	-	3	3	-	-	2	-
CO3	-	-	-	1	-	3	3	-	-	2	-
CO4	-	-	-	1	-	3	3	-	-	2	-
CO5	-	-	-	1	-	3	3	-	-	2	-

Unit I - Preparation for higher learning & research

9hrs.

Understanding the domains of higher learning, Opportunities for higher learning, thrust areas of exchange studies, possible interdisciplinary courses and learning opportunities.

Unit II - Career opportunities in hospitals

9hrs.

Registered Dietitian Examination, preparation, how to apply, syllabus, technical knowledge and skills required.

Unit III - Career opportunities in government sector & community

9hrs.

Various Ministry, National and state government departments open for recruiting officers and staff with food science and nutrition background.

Unit IV - Career opportunities in food industry & as entrepreneur

9 hrs.

Required Education & Training for a career in the Food Industry, *Opportunities as a Food technologist* Product/process development *scientist*, Quality manager, Regulatory affairs officer, Know about the Recruiters and roles and responsibilities. Small- and large-scale food-based business, how to initiate startups, applying for FSSAI, setting quality standards roles and responsibilities.

Unit V – Preparation for competitive exams

9hrs.

Various resources web links and websites for various relevant job applications. State employment Exchange registration.

Registered Dietitian Exam- Eligibility, registration, application, Syllabus.

NET /SLET Exams– Interior design, resource management, textiles and clothing, human development, extension education

Text books/ References:

1. Premalata, M, (2007), 'Text Book of Home science', Kalyani Publishers, Chennai.
2. Online resources

Evaluation Pattern

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

ELECTIVE C (SEMESTER VIII)

BAKERY AND CONFECTIONERY

Semester: VIII
Course Code:25FSN351
L-T-P – 2-0-1-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs.

Pre-requisite: Baking principles & bakery products

Course Objectives:

1. To create knowledge on the role of science and technology in baking
2. To integrate the role of different ingredients in bakery
3. To familiarize with skills in planning and establishing a bakery unit.

Course Outcomes:

CO1: Improved knowledge on principles of baking and appropriate sanitation, hygiene and safety practices during baking

CO2: Understanding the role of ingredients in baking quality.

CO3: Gain knowledge to set up a bakery unit.

CO4: Increased knowledge on the complete process of baking and presentation of baked products

CO5: Gain knowledge on the processing and preparation of confectionary products

Skills: Learned various baking skills to bake different products

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	-	-	-	1	1	-	1	-
CO2	1	2	-	-	-	-	1	1	-	1	-
CO3	1	-	-	-	-	-	1	1	-	2	-
CO4	1	1	1	-	-	-	1	1	-	2	-
CO5	1	1	1	-	-	-	1	1	-	2	-

Syllabus:

Unit I - Introduction to baking

8hrs.

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

Unit II - Role of Ingredients

8hrs.

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- Factors for setting up a bakery unit

10hrs.

Factors to be considered for Setting up a Bakery Unit

Types of Ovens – Construction and Working of Conventional and Modern Ovens, Study and Maintenance of Major and Minor Equipment's.

Bread Making – Steps and Methods, Role of Ingredients, Variety Breads, Qualities of a Good Loaf, Bread Faults, bread diseases.

Unit IV- Preparation and Decoration of baked foods

10hrs.

Cake Making – Functions of Ingredients

Cake Mixing Methods, Types of Cakes, Cake Judging, Cake Faults and remedies Biscuit, Cookie and Pastry Making, Types and techniques of Icing,

Frosting and fillings. Sensory evaluation of baked products- objective and subjective methods

Unit V - Confectionery

9hrs.

Processing of Raw Materials -Cocoa and Chocolate. Making of Toffee, Chocolates, Fruit Drops, Hard Boiled Candies (clear, hard, pulled, grained, filled), Soft candies (fondant, modified fondants like toffee, fudge, marshmallows, gums, jellies, chocolates) Bars, Chewing Gums, Special Confectionery Foods- tablets, Lozenges.

Practicals:

1. Introduction of tools and equipment's of bakery products.
2. Preparation of rich yeast fermented breads
3. Preparation of biscuits and cookies.
4. Preparation of pizza.
5. Preparation of various types of cakes.
6. Preparation of filling and icings.
7. Visit to a Professional Bakery

Reference Books:

1. The Baker's Book: A Practical Hand Book of the Baking Industry in All Countries, 2022, Emil Braun, Legare Street Press.
2. Potter, N. Food Science, The AVI Publishing Co., Inc., West Port, 5th edition, Connecticut, 2007.
3. Baker's Handbook on practical Baking. Wheat Associates, USA, New Delhi.
4. Dubey, SC, Basic Baking Science and Craft, Jwalmukhi Job Press, Bangalore, 1979.
5. Modern Pastry Chab, Vol.I and II, A VI Publishing Co., Inc., West Port, Connecticut, 1977.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

HOSPITALITY MANAGEMENT

Semester: VIII Course

Code:25FSN352

L-T-P –C 3 0 0 3

Hours of Instruction/ week – 3

No. of Credits – 3

Total 45 hrs.

Pre requisite: culinary art, front office, event management

Course Objectives:

1. Introduction to the basic of the hospitality and catering industry.
2. To educate on the procedures and practices adopted in hospitality management of hotel services.

Course Outcome:

CO1: Understand the basic concepts of culinary science and food production.

CO2: Gain basic knowledge on the equipment, menu and skills necessary for food and beverage service.

CO3: Acquire knowledge on principles and functions of room service and front office.

CO4: Comprehend the role of housekeeping and sanitation in hospitality and catering management.

CO5: Gain knowledge on event planning and management in various occasions.

Skills:

- Enhance knowledge and skills of different types of food and beverage services.
- Applying technical skills, knowledge of accommodation, front office and housekeeping operations in hotel industry.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	-	-	-	1	-	2	-	-	3	1
CO2	-	-	-	-	1	-	2	-	-	3	1
CO3	-	-	-	-	1	-	2	-	-	3	1
CO4	-	-	-	-	1	-	2	-	-	3	1
CO5	-	-	-	-	1	-	2	-	-	3	1

Syllabus:

45hrs.

Unit I - Food Production

9hrs

History – Culinary Science, Indian Cuisine and culture, Oriental and global cuisine, Basics of Food Science, Food Production, Portion control, types of menu planning, layout and organisation of kitchen, preservation of food, Food quality and storage, hygiene and sanitation, Pest control, FSSAI, HACCP system, ethics in hospitality management, cost control departments and its function.

Unit II - Food and Beverage Service

9hrs

Introduction to catering industry, responsibilities of F& B department , food& beverage outlets, ancilliary departments, equipments used in F & B, classification of alcoholic beverages, Menu in F & B - Courses of French Classical –Sequence, Knowledge of accompaniments of continental dishes, types of food service, control system, non-alcoholic beverages.

Unit III- Accommodation and Front Office Operation

9hrs

Origin & growth of hospitality industry, classification of hotel, hotel organization, front office function areas, inter departmental communication. Interior design definition, theory of standard dimension based on human figures for activities, principles of interior design, history of interior design, types-non European traditions, Indian traditional designs, designing of furniture & flooring, Flower arrangement.

Unit IV- Housekeeping Operation

9hrs

Role and responsibility of housekeeping department, inter departmental coordination of housekeeping, classification of cleaning agents and equipments, housekeeping departments, control desk, hygiene personal hygiene, hygiene and sanitation of guest rooms and public areas, eco-friendly cleaning agents - security in guest rooms.

Unit V- Event Management

9hrs

Introduction to meeting and event management, Event planning, Event planning, Designing, Program scripting – public relation – electing a location - social and business etiquette – speaking skills – stage decoration – team spirit – time management, Concept of exhibition - space planning – ITPO- sporting events – tourism events – leisure events, food festivals– expo, carnival, mela.

Activity

1. Visit to a Hotel/Guest House

Textbooks:

1. Hotel Housekeeping operations and Management, 4th edition, 2023, Oxford university Press G.Raghubalan, Smritee Raghubalan
2. Food Production Operations, 3rd edition, Parvinder S. Bali , 2021, New Delhi : Oxford University Press, 2022.
3. Catering Management : An Integrated Approach. By M. Sethi. About this book · New Age International, 2022

Reference Books:

1. Dennis.R.Lillicrap and John.A.Cousins. Food and Beverage Service: Great Britain. ELBs Publishers.6th Edition.2002.
2. John Fuller. Modern Restaurant Service, A Manual for Students and Practitioners: Cheltenham. Stanley Thrones Publishers.1st Edition.1999.
3. Sudhir Andrews. Food and Beverage Service Training Manual: New Delhi. Tata Mcgraw Hill Publishers. 36th reprint.2005
4. Sue Baker, Pam Bradly and Jeremy Huyton Principles of Hotel Front Office Operations: London. Cassell Publishers. 2 nd Edition 2004.
5. S.K.Bhatnagar. Front Office Management: New Delhi. Frank Bros, and CoPublishers Ltd., 1 st Edition.2002

Evaluation Pattern

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD SAFETY AND QUALITY CONTROL

Semester: VIII

Course Code: 25FSN353

L-T-P – 2-1-0-3

Hours of Instruction/ week – 3

No. of Credits – 3

Total 45 hrs.

Pre –requisite: Food safety, Consumer awareness, Nutrition information and labelling

Course Objectives:

1. To impart the better understanding on the role of sanitization and hygiene to produce quality food.
2. To get familiarize with standards for quality assessment and food safety and critical assessment and control points for quality assurance.

Course Outcome:

CO1: Basic understanding of sanitization, hygiene, safety and quality.

CO2: Acquire knowledge in food quality analysis materials and food additives.

CO3: Grasping the principles of food quality control, laws and food adulteration used in industry.

CO4: Gain knowledge on methods for determining quality of foods using subjective and objective methods.

CO5: Expertise food safety management, hazards analysis and control measurements.

Skills: Develop skills in food safety and food quality management

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	2	-	1	-	-	-	-	-	2	2
CO2	-	2	-	1	-	-	-	-	-	3	-
CO3	-	2	-	1	-	-	-	-	-	2	-
CO4	-	2	-	1	-	-	-	-	-	3	-
CO5	-	2	-	1	-	-	-	-	-	3	-

Syllabus:

Unit I-Basics of Food Safety

8hrs.

Water, Sanitation, Hygiene, Food quality, Food selection, Food Safety, House hold hygiene, Food safety measures during food production, Organization of quality control function in the food industry.

Unit II-Principles of Quality Control of Food

10hrs.

Raw material control, processed control and finished product inspection. Leavening agents, classification, uses and optimum levels.

Food additives - Preservatives, colouring, flavouring, sequestering agents, emulsifiers and antioxidants.

Unit III- Standardization systems for quality control of foods**8hrs.**

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 IV- Methods for determining quality**10hrs.**

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**9hrs.**

The concept of food safety and its definition. Elements of food safety management. Challenges in management of food safety and outlook. Hazards associated with foods – Milk and dairy products; meat, egg and poultry; fruits and vegetables; nuts and oil seeds. Control of hazards and management of safety of foods at raw and processed stage.

Hazard Analysis and Critical Control Point System (HACCP): Introduction, the need for HACCP, Principles of the HACCP System and application of HACCP, microbiological criteria in food packaging.

PRACTICALS

Assessment of quality parameters and adulterants in different foods

1. Survey of label information of foods in market
2. Cereals, Pulses and Flours – Label information, detection of adulterants
3. Fats and oils – Label information, Adulterant tests, Iodine number and FFA Value
4. Fruit and vegetable products – Label information, Acidity, TSS, Sugars
5. Coffee and Tea, Honey – Label information, Detection of Adulterants
6. Milk and milk products- Label information, COB test, Acidity, MBRT, Detection of adulterants.
7. Spices and Condiments- Label information, Detection of adulterants.

Reference Books:

1. Guide to Improve Food Hygiene - Gaston and Tiffney, 3rd Edition, 2021
2. Practical Food Microbiology & Technology - Harry H. Weiser, Mountney, J. and Gord, W.W., 2021
3. Principles of Food Sanitation - Marriott and Norman, G. 6th edition 2018
4. Jay M.J (2015) Modern Food Microbiology, Fourth Edition, CBS Publishers and Distributors, New Delhi
5. Mahindra-S.N.-Food safety –A techno-legal analysis-Tata McGrawhill publishers 2018.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

CORE ELECTIVE (SEMESTER VI)

FOOD FORTIFICATION

Semester VI
Course Code: 25FSN361
L-T-P –3 0 0-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs

Course objectives:

1. Understand the principles, importance and methods of food fortification.
2. Learn various aspects of fortified food products.

Course outcomes:

CO1: Acquire knowledge on different techniques used for fortifying foods.

CO2: Empowering the knowledge on nutrients used as fortificants.

CO3: Gain precise knowledge on various fortificants and vehicles

CO4: Generate cost-effective and safe fortified foods for target populations.

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	1	-	-	1	-	1	2	1	1	2
CO2	2	1	-	-	1	-	1	2	1	1	2
CO3	2	1	-	-	1	-	1	2	1	1	2
CO4	2	1	-	-	1	-	1	2	1	1	2

Syllabus

Unit I: Food Fortification

15hrs

Food fortification: Definition, types, Legal considerations, Mandatory vs. Voluntary fortification, importance and health benefits; Food vehicles and Fortificants: Selection of food vehicles, criteria for selection of food fortificants, Bioavailability, Stability and interaction of fortificants in the foods.

Unit II: Nutrients as Fortificants

10hrs

Vitamins (A, B, C and D) and minerals (iron, iodine, zinc and calcium) – Sources, Physical characteristics and choice of fortificant methods to increase absorption of fortificants/prevention of loss, Fortification premixes - design and composition of premixes.

UNIT III: Foods as Vehicles for Fortification

10hrs

i) Rice, Cereal flours, cereal products (bread, pasta, noodles, biscuits and ii) Salt and sugar, iii) edible oils, iv) Beverages; v) Candies, Nutri- bars, and Granola bars, vi) Snack food, water and other foods. Technology of fortification, challenges (safety, technological and cost limits), packaging and shelf life quality of fortified foods.

Unit IV: Guidelines for Fortification

10hrs

Merits and demerits of fortification, choice of products and selection of micronutrients, Setting level of fortification, Safety limits, Technological and cost limits, Challenges in fortifying snack products, Nutrient interaction and bioavailability.

References

1. Handbook of Food Fortification and Health: From Concepts to Public Health Applications Volume 2 (Nutrition and Health), 2016.
2. Preedy VR, Srirajavenkathan R and Patel VB. Handbook of Food Fortification and Health, Vol. 1 & 2, Springer Publications. 2013.
3. Stakeholder consultation on Regulation for staple food Fortification: 15 April 2011: National Institute of Nutrition and Indian Council of Medical Research, Hyderabad, working paper
4. Food Fortification and Supplementation: Technological, Safety and Regulatory Aspects (Woodhead Publishing Series in Food Science, Technology and Nutrition) Hardcover – Import, 31 March 2008.
5. Guidelines on Food Fortification with Micronutrients. Allen L, Benoist BD, Dary O and Hurrell R WHO and Food and Agricultural Organization, USA. 2006.
6. Lindsay Allen, Bruno de Benoist, Omar Dary and Richard Hurrell (Eds.) 2006 Guidelines on food fortification with micronutrients: World Health Organization and Food and Agriculture Organization of the United Nations

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Seminar, Projects and Reports

FOOD INDUSTRY MANAGEMENT

Semester: VI

Course Code: 25FSN362 L-T-P – 3 0 0 3

L – T- P- 3 0 0 3

Hours of Instruction /Week-3

No. of Credits - 3

Total 45 hrs

Course Objectives:

1. Understand the basic concepts of food industry and future priorities in food production
2. Comprehend the guidelines for good maintenance & safety precautions in food industry
3. Gain knowledge on improving sustainability in food sector

Course Outcomes:

CO1: Understand the components, organization of food industry and future challenges in food production sector

CO2: Acquire knowledge on food industry maintenance

CO3: Gain knowledge on food safety and assurance system in food industry

CO4: Analyse different aspects of sustainability and ethics in food industry

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	-	-	-	-	-	-	-	-	3	-
CO2	-	-	-	-	-	-	-	-	-	3	-
CO3	-	-	-	-	-	-	-	-	-	3	-
CO4	-	-	-	2	-	-	-	-	-	3	-

Syllabus

Unit I- Food Industry - An Overview

14 Hrs

Food Industry- Trends in food industry- Global and Indian perspective. Components of Food Industry. Organization in food industry. Operations of food industry. Deteriorative factors and hazards during processing, storage, handling and distribution. Food regulatory bodies and mechanisms, certification process to set up micro, macro model food industries. Future priorities in food production and challenges.

Unit II - Food Industry Maintenance

14 Hrs

Food Industry -Maintenance of staff and plant operators; Preventive maintenance; Guidelines for good maintenance & safety precautions; Work place improvement through '5S'. Wastewater and solid waste treatment. Financial management & financing for food industries. Marketing and E-Trading. Handling customers' complains, evaluation and solution of problems, Report making. Corrective action preventive action (CAPA) in food industry.

Unit III- Food Safety and Assurance System in Food Industry

16 Hrs

Principles and systems for quality and food safety management. Hygienic designs and maintenance of equipments in food industry. HACCP and its misconception in food industry. Management of hazards. Assessment of food safety management systems. Incident management and root cause analysis. Crisis management in food industry. Significance of international, regional and national organisation in food production sector.

Unit IV – Sustainability and Ethics in Food Industry

16 Hrs

Sustainability and food production in future. Food safety and sustainability. Social, economic and environmental aspects of sustainability and food production. Food Industry waste management. Improving sustainability in food sector. Impact of climatic change in food safety. Nutritional trends and health claims. Preparation of business proposals. Starting a Food Industry. Case studies on project formulation in various types of food industries. Ethics in food safety management- Ethical issues in food production and food safety. Ethical decision-making.

Text Books:

1. Swainson M. (2018). Swainson's Handbook of Technical and Quality Management for the Food Manufacturing Sector, Woodhead Publishing, UK.
2. Jordan L. (2015). Food Industry: Food Processing and Management. Callisto Publishers, USA.

Reference Books:

1. Lelieveld H. and Motarjemi Y. (2013). Food Safety Management: A Practical Guide for the Food Industry. Elsevier Science. Academic Press, USA.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Seminar, Projects and Reports

GENERIC ELECTIVE

ELECTIVE –A (SEMESTER III, VI, VIII)

FOOD TOXICOLOGY

Semester: III, VI, VII
Course Code:25FSN371
L-T-P-C 3-0-0-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs.

Prerequisite: Basic Food Groups, Food Additives, Food Microbiology

Course Objectives:

1. To obtain basic knowledge on the principles of food toxicology and the impact of natural toxins in foods.
2. To analyze and study the influencing factors like environment, toxins, drugs, and additives on food allergens and sensitivity.

Course Outcomes:

CO1: Acquire knowledge of the principles of food toxicology.

CO2: Gain knowledge on the impacts of natural toxins in foods.

CO3: Understand the relationship between food allergens and sensitivity

CO4: Gain knowledge on Environmental contaminants and drug residues in food

CO5: Develop food processing skills and understand the role of food additives and toxicants.

Skills:

- Develop skills on the identification of food allergens
- Acquire skills in understanding toxins, harmful additives

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	-	-	-	-	-	-
CO4	1	-	-	-	-	-	-	-	-	-	-
CO5	1	-	-	-	-	-	-	-	-	1	-

Syllabus:

Unit I- Principles of Toxicology

9Hrs

Classification of toxic agents. Characteristics of exposure. The spectrum of undesirable effects. Interaction and tolerance. Biotransformation and mechanisms of toxicity. Evaluation of toxicity- risk vs. benefit. Experimental design and evaluation- Prospective and retrospective studies. Controls: Statistics (descriptive and inferential). Animal models as predictors of human toxicity. Legal requirements and specific screening methods as per OECD guidelines in vitro and in vivo studies. Clinical trials.

Unit II -Natural Toxins in Food**9Hrs**

Natural toxins of importance in food- toxins of plant and animal origin. Microbial toxins (e.g., bacterial toxins, fungal toxins and Algal toxins)- Natural occurrence, toxicity and significance. Determination of toxicants in foods and their management.

Unit III- Food Allergies and Sensitivities**9Hrs**

Natural sources and chemistry of food allergens, True/untrue food allergies. Handling of food allergies. Food sensitivities (anaphylactoid reactions, metabolic food disorders, and idiosyncratic reactions). Safety of genetically modified food- potential toxicity and allergenicity of GM foods. Safety of children's consumables.

Unit IV- Environmental Contaminants and Drug Residues in Food**9Hrs**

Fungicide and pesticide residues in foods; heavy metal and their health impacts. Use of veterinary drugs (e.g. Malachite green in fish and β agonists in pork). Radioactive contamination of food, Food adulteration and potential toxicity of food adulterants. Endocrine disrupters in food. Microplastics in food: Health risks and solutions.

UNIT V- Toxins generated during Food Processing**9Hrs**

Safety of food additives. Toxicological evaluation of food additives. Food processing generated toxicants- Nitroso-compounds, heterocyclic amines. Dietary Supplements and toxicity related to dose- common dietary supplements. Relevance of the dose. Possible toxic effects.

Textbooks:

1. Klaassen, Curtis K., Watkins III, John B. (2021). Essentials of Toxicology, 4th Edition, McGraw-Hill Medical, USA.
2. Casarett & Doull's. (2019). Toxicology: The Basic Science of Poisons, 9th Edition. Mcgraw-Hill Medical, New York.
3. Galanakis C.M. (2020). Food Toxicology and Forensics. Academic Press, USA.

Reference Books:

1. Fletcher M. and Netzel G. (2020). Food Safety and Natural Toxins. Mdpi AG publishers, Switzerland.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1(P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

NUTRITION IN EMERGENCIES AND DISASTER MANAGEMENT

Semester: III, VI, VIII
Course Code: 25FSN372
L-T-P-C 3-0-0-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs.

Prerequisite: Basic food groups and functions; Significance of macro and micronutrients

Course Objectives:

1. Understand the emergency, nutrition surveillance, and treatment during disasters and pandemic
2. Gain knowledge on relief and rehabilitation during nutritional emergencies

Course Outcomes:

CO1 Acquire knowledge in nutritional problems in natural and man-made disasters and emergencies
CO2 Assess the nutritional status in emergency and plan surveillance and treatment to the affected
CO3 Acquire knowledge on nutritional relief and rehabilitation
CO4 Gain insight on nutrition recommendation of special environments
CO5 Plan and execute rehabilitation during nutritional emergencies-endemic, epidemics and pandemics

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	-	-	-	-	-	2	-	1	-	1
CO2	-	1	-	-	-	-	2	-	1	-	-
CO3	1	2	-	-	-	-	3	-	3	-	2
CO4	-	-	-	-	-	-	2	-	1	-	1
CO5	-	-	-	-	-	-	2	-	1	-	1

Syllabus:

UNIT I – Disaster and Nutritional Emergencies- An Overview

9 Hrs

- **Natural/Manmade disasters resulting in emergency situations-** Famine, drought, flood, earthquake, cyclone, war, civil and political emergencies. Factors giving rise to emergency situations in these disasters. Nutritional management during disaster.
- **Nutritional problems in emergencies among vulnerable groups-** Causes of malnutrition in emergency situations, Major deficiency diseases in emergencies, Protein Energy Malnutrition, Starvation, Under Nutrition. Dietary and medical treatment during nutritional emergencies.
- **Communicable disease evolving emergency situations-** Surveillance, medical and dietary treatment. Role of immunization and sanitation.

UNIT II -Need Based Assessments

9 Hrs

- Assessment and surveillance of Nutritional status in emergency affected populations: Scope of assessment of malnutrition in emergencies, Indicators of malnutrition. Clinical signs for screening acute malnutrition, Anthropometric assessment and biochemical examination during nutritional emergencies.
- Disaster and emergencies specific assessment tool construction
- Organization of nutritional surveillance and individual screening.

UNIT III- Nutritional Relief and Rehabilitation

9 Hrs

- Assessment of food needs in emergency situations, Food distribution strategy – Identifying and reaching the vulnerable group – Targeting Food Aid.
- Mass and Supplementary Feeding, Therapeutic Feeding, Special foods/rations for nutritional relief, Local production of special foods, Local foods in rehabilitation
- Organization of mass feeding/general food distribution, Feeding centers, Transportation and food storage, Sanitation and hygiene, Evaluation of feeding programmes, Household food security and nutrition in emergencies
- Public nutrition approach to tackle nutritional problems in emergencies

Unit IV- Nutrition Recommendation of Special Environments

9 Hrs

- **Nutritional requirement in High altitudes and Low temperatures-** Oxidative stress at High altitudes and Low temperatures. Muscle metabolism during cold stress and high altitudes. Dietary supplements and superfoods. Nutrients and cognitive functioning at high altitudes and low temperatures.
- **Human health and performance risk at space exploration and submarines-** Human Metabolism during space exploration and underwater. Energy utilization in space flights. Protein and muscle homeostasis. Fluid and electrolyte homeostasis during space exploration. Calcium and related nutrients in bone metabolism. Iron metabolism and changes in RBCs metabolism. Antioxidants- Radiation and stress. Nutritional recommendation at space exploration and submarines.

Unit V - Nutritional Emergencies during Endemic, Epidemics and Pandemics

9 Hrs

- **Endemic, Epidemics and Pandemics** -Globally and Indian scenario. Escalation of an epidemic to a pandemic. Stages of pandemic. Impact of endemic, epidemics and pandemics on human health.
- **Diet and Nutritional Emergencies-** Dietary treatment during endemic, epidemics and pandemics. Role of antioxidants and superfoods during these nutritional emergencies.

Practicals/ Assignments:

1. Collection of epidemiological data-a hands-on experience.
2. Selection and Rapid assessment of nutritional status in a community.
3. Case study approach on causative factors and management of communicable diseases.
4. Planning and formulation of nutrient-dense foods.
5. Survey on adherence to immunization schedule and vaccines.

Reference Books:

1. World Disasters Report (2020). Focus on Public Health, International Federation of Red Cross and Red Crescent Societies.
2. Disasters – International Public Nutrition and Emergencies: The Potential for improving practice. Special Issue – Vol.23/4, Dec. 1999.

3. Guidelines and Research publications of OXFAM, WFP, Rome. 1999. Nutrient Requirements and Recommended Dietary Allowance for Indians A Report of the Expert Group of ICMR. 2010.
4. Dr.M Swami Nathan. (2010). Food and Nutrition Volume-2 Second Edition the Bangalore Printing and Publishing Co Ltd Bangalore 560018.
5. ShubhanginiA.Joshi. (2010). Nutrition and Dietetics Third Edition Tata Mecgraw Hill Education Private Limited New Delhi.

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+P2/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

PHYSICAL CHEMISTRY OF FOOD CONSTITUENTS

Semester: III, VI, VIII
Course Code: 25FSN373
L-T-P – 3-0-0-3

Hours of Instruction/ week – 3
No. of Credits – 3
Total - 45 hrs.

Pre requisite: Basics of Bonding, thermodynamics, kinetics and surface chemistry.

Course Objective: To impart knowledge on the basic physical chemistry aspects with respect to food

Course Outcomes:

CO1: To relate the application of thermodynamics in understanding the chemistry of food

CO2: To understand the concept of solutions of solid in liquid and liquid in liquid and the properties related to the concentration of solute.

CO3: To gain knowledge on the colloids and the special properties of colloids

CO4: To understand the basics on surface activity and surface reactions

CO5: To provide knowledge on the rheological properties, its measurement and its application to food

Skills: Develop skills in the application of physical properties of foods in product development

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	1	-	-	-
CO3	1	1	-	-	-	-	-	-	-	-	-
CO4	1	-	-	-	-	-	-	-	-	-	-
CO5	1	1	-	-	-	-	-	-	-	-	-

Syllabus:

Unit I- Thermodynamics

9 hrs

System and surrounding, homogenous and heterogeneous system, Intensive and extensive properties, Entropy, Enthalpy, Gibb's free energy, stable- unstable systems. Heat capacity, specific heat capacity- measurement of specific heat capacity using Bomb calorimeter

Unit II- Solutions

9 hrs

Solubility-relative solubility, Concentration of solutions, Solutions of solid in liquid, Factors influencing solubility, Energy of hydration, Solvation, solutions of liquid in liquid. Colligative properties-Lowering of vapour pressure, elevation of boiling point, depression of freezing point and osmotic pressure.

Unit III- Colloidal chemistry

9 hrs

Types of colloids-Lyophilic and Lyophobic colloids, classification of colloids, stability of lyophobic and lyophilic sol, emulsification, foaming, light scattering, destabilization of emulsions and foams. Isoelectric point, protection of colloids - protective colloids, Gold Number, Hofmeister series, coagulation or flocculation, coacervation, sensitization, micelle and critical micellation concentration, application of colloids. Sedimentation, Coalescence, gelatinization.

Unit IV- Surface chemistry

9 hrs

Surface tension, interface tension, capillary effects, surface activity, surfactants, wetting, contact angle, adsorption-types and mechanism, catalysis- bio catalyst- enzymes, self-assembly of macromolecules, thermodynamics of self-assembly.

Unit V- Rheology

9 hrs

Rheological classification of foods. Rheology of solid foods, rheology of liquid foods, Hooke's law, Newtonian flow, non-Newtonian flow, gel flow- viscoelasticity, methods of viscoelasticity. Factors influencing rheological properties, measurement of rheology, application of study of rheology in food industry.

Text Books:

1. Principles of food chemistry, John M Deman, 4th edition, An Aspen publication, Maryland, 2018
2. Physical chemistry of foods- Pieter Walstra, Marcel Dekker Incorporation, The Netherlands, 2003.
<https://www.dekker.com>

Reference book

1. Introduction to the physical chemistry of food, Christos Ritzoulis, 1st edition, CRC press, 2013

Evaluation Pattern

Assessment	Internal	External
Periodical 1 (P1)+ Periodical 2 (P2)/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar.

GENERIC ELECTIVE –B (SEMESTER V, VII, VIII)

POST-HARVEST TECHNOLOGY

Semester V

Course Code: 25FSN375

L-T-P – 3-0-0-3

Hours of Instruction/ week – 3

No. of Credits – 3

Total 45 hrs.

Pre-requisite: Post-harvest loss, processing methods, storage, handling, transportation of commodities.

Course Objectives:

1. To understand the importance and methods of post-harvest techniques for foods
2. To gain knowledge in food processing and food conservation

Course Outcome:

CO1: Gain understanding on significance of post-harvest technology.

CO2: Understand the processing of cereals and pulses

CO3: Gain knowledge on different processing and post harvest loss of fruits and vegetables

CO4: Understand the methodologies of different processing and post harvest loss of animal based foods

CO5: Understand the requirement of storage structures in post harvest technology for plantation crops

Skills: To develop skills in food processing of plantation crops

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	-	-	-	1	1	1	-	-	1	-
CO2	2	-	-	-	1	1	1	-	-	1	-
CO3	2	-	-	-	1	1	1	-	-	1	-
CO4	2	-	-	-	1	1	1	-	-	1	-
CO5	2	-	-	-	1	1	1	-		1	-

Syllabus:

UNIT I- Introduction To Post Harvest Technology

9hrs.

Introduction to Post Harvest Technology - Definition, importance and problem encountered. Buffer stock – definition, quantity of stores available. Role of agencies in controlling food loss, FCI ware houses, marketing loss.

UNIT II- Processing of Cereals, Pulses, Nuts and Oil Seeds

9hrs.

Processing methods, factors affecting processing, postharvest losses, storage structures and infestation, control methods of insects and pests

UNIT III Processing of Vegetables and Fruits**9hrs.**

Vegetables-Processing methods, Maturity index, Changes during maturation, selection of vegetables, post-harvest changes and losses, storage structures and infestation.

Fruits- Processing methods, Maturity index, Changes during maturation, ripening of fruits, selection of fruits, post-harvest changes and losses, storage structures and infestation.

UNIT IV Processing of Meat, Poultry, Dairy and Fish**9hrs.**

Meat- Processing, Post-mortem changes, ageing, curing, tenderizing, storage and spoilage.

Poultry-Processing, storage and spoilage.

Fish- Processing, storage and spoilage.

Dairy-Milk, milk products, milk substitutes-Processing-Pasteurization, sterilization, milk spoilage, storage of raw and processed milk

UNIT V- Sugars, Plantation crops, Spices and Condiments**9hrs.**

Sugar-Harvesting, post-harvest losses, processing, storage, infestation and its control.

Plantation crops- Tea, coffee, cocoa- Post harvest losses, maturation, processing, Fermentation.

Spices and condiments- Post harvest losses, maturation, processing, storage structures.

Related Experiences:

1. Visit to FCI
2. Visit to Processing Mill (Cereal & Pulse)
3. Food park with cold storage

Reference Books:

1. Handling and storage of food grains- S V Pingale ICAR, New Delhi, 1976.
2. Handling and storage of food grains in tropical and subtropical areas- D W Hall, FAD, Rome, 1970.
3. Food Science, N.W.Potter- The A VI Publishing Co., The Westport, 1973.
4. Food Technology, Prescott and Proctor.B.B.Mc Graw Hill Book Co., New York, 1937.
5. Gordon G Birth, Food science, Pub in New York.
6. Robins M Philip Convenience food- Recent Technology 1976.
7. Technology of cereals by NL Kent and JAD Evers.
8. Food protection technology by Charles W., Felix Havis Pub.1987.
9. John A Troller, 1983, Sanitation in food processing, Academic press

Evaluation Pattern

Assessment	Internal	External
Periodical 1 & Periodical 2 / Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

FOOD BIOTECHNOLOGY

Semester: V, VII, VIII
Course Code: 25FSN376
L-T-P –C 3 0 0 -3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs.

Pre requisite: Genetic engineering, enzymes and microbes, fermentation

Course Objectives:

1. To give an understanding on the role of enzymes as a tool in genetic engineering and biotechnology
2. To make learners aware on the principles of genetic engineering, plant tissue culture and molecular cloning
3. To enable learners to understand the concept of fermentation biotechnology
4. To delineate the role of microbes in the application of biotechnology in Food Science and Nutrition

Course Outcomes:

CO1: Gain knowledge on the enzymes as tools used in genetic engineering

CO2: Expand the knowledge of food biotechnology in relation to genetic engineering and plant tissue culture.

CO3: Understand on the basic principles of fermentation technology and the application of fermentation in biotechnological industry.

CO4: Helps to keep abreast application of microbes in food industry.

CO5: Understanding the role of enzymes in food industry.

Skills: Develop appropriate skills involved in food biotechnology and genetic engineering

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	1	-	-	-	-	-	-	-	1	1
CO2	1	1	-	-	-	-	-	-	-	1	1
CO3	1	1	-	-	-	-	-	-	-	1	1
CO4	-	1	-	-	-	-	-	-	-	1	-
CO5	1	1	-	-	-	-	-	-	-	1	-

Syllabus:

Unit I - Introduction and Tools of Genetic Engineering

10hrs.

Definition, enzymes as tools - exonucleases, endonucleases, ligases, reverse transcriptase and alkaline phosphatase, cloning vectors-plasmids, bacteriophage, cosmids and phasmids. Nutrigenomics and its nutritional implications.

Unit II Genetic Engineering and Plant Tissue Culture**10hrs.**

Outline of genetic engineering in prokaryotes (microbial cells), concepts of molecular cloning, plant tissue culture, micro propagation, transgenic plants, genetically modified foods-golden rice, flavr savr tomato and Bt brinjal; enlisting applications of genetic engineering, isolation of DNA and Plasmids.

Unit III - Fermentation Biotechnology**8hrs.**

General structure of bioreactors and listing types, bacterial growth curve, batch and continuous culture, environmental factors, basic concepts of downstream processing, definition of biochips and biosensors

Unit IV- Use of Microbes in Food Industry**8hrs.**

Primary metabolites, secondary metabolites, synthesis of citric acid, glutamate, xanthan gum, vitamin B12, riboflavin and Single Cell Protein – spirulina and yeast biomass

Unit V - Enzyme Biotechnology**9hrs.**

Soluble enzymes, immobilization of enzymes – methods of immobilization, role of enzymes in food industry, safety assessment of transgenic crops

Text Books:

1. Dubey, R.C., 2014, A Text Book of Biotechnology, 5th revised edition, S. Chand and Company Ltd., New Delhi.
2. Green, P.J., 2010, Introduction to Food Biotechnology, CRC Press, USA.

Reference Books:

1. Dietrich Knorr, 2017, Food Biotechnology, Marcel Dekker Inc., New York.
2. Owen, P. Ward, 2018, Fermentation Biotechnology, Principles, Processes and Products, Prentice Hall, Advanced Reference Series, New Jersey, 07632

Evaluation Pattern:

Assessment	Internal	External
Periodical 1 (P1)+ Periodical 2 (P2)/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

NUTRITION EDUCATION AND COMMUNICATION

Semester: V, VII, VIII
Course Code: 25FSN377
L-T-P – 3 0 0 -3

Hours of Instruction/ week – 3
No. of Credits – 3
Total 45 hrs.

Pre requisite: Nutrition & counseling.

Course Objectives:

1. To expose on the methods of nutrition education
2. Understand the significance of Information Education and Communication (IEC) tools for nutrition education
3. Develop skills on how to plan, execute and evaluate a nutrition education programme.

Course Outcomes:

- CO1: Understand appropriate skills for developing nutrition education materials
CO2: Gain knowledge on mass communication, media and aid tools for nutrition education
CO3: Utilize different communication tools for nutrition education
CO4: Gained knowledge to organize nutrition education programmes
CO5: Understand the various approaches and strategies for improving nutritional status and health

Skills: Develop skills in organizing nutrition education programmes

CO-PO Mappings

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	-	-	1	3	3	-	1	-	-	1
CO2	1	-	-	1	3	3	-	1	-	-	1
CO3	1	-	-	1	3	3	-	1	-	-	1
CO4	1	-	-	1	3	3	-	1	-	-	1
CO5	1	-	-	1	3	3	-	1	-	-	1

Syllabus:

Unit I - Nutrition Education

9hrs.

Nutrition Education Meaning, nature and importance of nutrition education to the community and the lessons to be taught. Training workers in nutrition education programs, integration of nutrition education with education and extension work. Principles of planning, executing and evaluating nutrition education programs, problems of nutrition education, Nutrition education approaches

Methods of Nutrition Education - Direct and Indirect Methods , Individual and Group Contacts, Types, Methods (Participatory Learning Method, Village Resource mapping, Focus group discussion), Merits and Demerits

Unit II - Mass Communication in Nutrition Education**9hrs.**

Definition, Merits and Demerits, Types – Print Media, Newspapers, Magazine, Leaflets, Pamphlets, Radio, Television, Films, Film Strips

Unit III - Tools in Nutrition Education**9hrs.**

IEC Materials - Significance of IEC materials, types, Advantages and Limitations, Design and development of IEC materials

Related Experiences

Preparation of chart or poster or leaflets

Digital Health Interventions: Mobile Health, Mobile App, online communication, Dietary survey, Web sources

Uses of Folk Media in Nutrition Education - Types of Folk Media, Merits and

Demerits Related Experiences

Preparation of Skits or Puppet Shows or Villupattu

Unit IV - Organizing Programmes in Nutrition Education**9hrs.**

Introduction – Selection of Theme, Planning the Programme, Executing the Programme, Evaluation of the Programme

Unit V Approaches and Strategies for improving nutritional status and health**9hrs.**

Approaches and Strategies for improving nutritional status and health, Health-based interventions, Food-based interventions including fortification and genetic improvement of foods, supplementary feeding, Nutrition education for behaviour change, environmental sanitation, Food Nutrition and health WASH interventions, National and state governmental nutrition education intervention programmes.

Text books:

1. Srilakshmi, B., Nutrition Science, 8th Edition, New Age International (P) Ltd., New Delhi, 2023.
2. Nutrition Education: Linking Research, Theory, And Practice, 2020, Isobel R. Contento, Pamela A Koch, 4th Edition, Jones and Bartlett Publishers, Inc

Reference books:

1. Textbook of community nutrition, 6 th edition, Suryatapa das, 2023
2. Community Nutrition by V Srilakshmi, B; Suganthi, 2022
3. Community Nutrition and Health by Bhavana Sabarwal, 2023
4. Food Nutrition and Community Health, Dr. Vikas Singh & Dr. Gyanendra kumar, 2020

Evaluation Pattern

Assessment	Internal	External
Periodical 1 (P1)+ Periodical 2 (P2)/Midterm	30	
*Continuous Assessment (CA)	20	
End Semester		50

*CA - Can be Quizzes, Assignment, Projects, and Reports, and Seminar

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**FREE ELECTIVES OFFERED UNDER HUMANITIES / SOCIAL SCIENCE STREAMS
COMMON TO ALL PROGRAMS**

23CUL230

ACHIEVING EXCELLENCE IN LIFE -AN INDIAN PERSPECTIVE

L-T-P-C: 2-0-0-2

Course Objectives:

The course offers to explore the seminal thoughts that influenced the Indian Mind on the study of human possibilities for manifesting excellence in life. This course presents to the students, an opportunity to study the Indian perspective of Personality Enrichment through pragmatic approach of self analysis and application.

Syllabus Unit

1

Goals of Life – Purusharthas

What are Purusharthas (Dharma, Artha, Kama, Moksha); Their relevance to Personal life; Family life;

Social life & Professional life; Followed by a Goal setting workshop;

Yogic way of Achieving Life Goals – (Stress Free & Focused Life)

Introduction to Yoga and main schools of Yoga; Yogic style of Life & Time Management (Work Shop);

Experiencing life through its Various Stages

Ashrama Dharma; Attitude towards life through its various stages (Teachings of Amma);

Unit 2

Personality Development

What is Personality – Five Dimensions – Pancha Kosas (Physical / Energy / Mental

/ Intellectual / Bliss); Stress Management & Personality; Self Control & personality; Fundamental Indian

Values & Personality;

Learning Skills (Teachings of Amma)

Art of Relaxed Learning; Art of Listening; Developing ‘Shraddha’ – a basic qualification for obtaining Knowledge;

Communication Skills - An Indian Perspective;

Unit 3

Developing Positive Attitude & Friendliness - (Vedic Perspective);

Achieving Work Excellence (Karma Yoga by Swami Vivekananda & teachings based on

Amma); Leadership Qualities – (A few Indian Role models & Indian Philosophy of

Leadership);

REFERENCE BOOKS:

1. *Awaken Children (Dialogues with Sri Mata Amritanandamayi) Volumes 1 to 9*
2. *Complete works of Swami Vivekananda (Volumes 1 to 9)*
3. *Mahabharata by M. N Dutt published by Parimal publications – New Delhi (Volumes 1 to 9)*
4. *Universal message of Bhagavad-Gita (An exposition of Gita in the light of modern thought and Modern needs) by Swami Ranganathananda. (Vols.1 to 3)*
5. *Message of Upanishads, by Swami Ranganathananda published by Bharatiya Vidya Bhavan, Bombay.*
6. *Personality Development – Swami Vivekananda published by Advaita Ashram, Kolkatta.*
7. *Art of Man Making - Swami Chinmayananda published by Chinmaya Mission, Bombay*
8. *Will Power and its Development- Swami Budhananda published by Advaita Ashram, Kolkatta*
9. *Ultimate Success - Swami Ramakrishnananda Puri published by Mata Amritanandamayi Math, Kollam*
10. *Yoga In Daily Life - Swami Sivananda – published by Divine Life Society*
11. *Hindu Dharma - H. H. Sri Chandrasekharandra Saraswati published by Bharatiya Vidya Bhavan, Bombay*

12. *All about Hinduism – Swami Sivananda - Published by Divine Life Society*
13. *The Mind and its Control by Swami Budhananda published by Advaita Ashram, Kolkatta*
14. *Krida Yoga - Vivekananda Kendra, Publication.*
15. *Valmiki Ramayana – Four volumes- published by Parimal Publications, Delhi*
16. *New perspectives in Stress Management - Dr H R Nagendra & Dr R Nagaratna published by SwamiVivekananda Yoga Prakashana, Bangalore.*
17. *Mind Sound Resonance Technique (MSRT) Published by Swami Vivekananda Yoga Prakashana,Bangalore.*
18. *Yoga & Memory - Dr H R Nagendra & Dr. Shirley Telles, published by Swami Vivekananda YogaPrakashana, Bangalore.*

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus

Unit 1

1. The anatomy of 'Excellence'. What is 'excellence'? Is it judged by external factors like wealth?
2. The Great Flaw. The subject-object relationship between individual and world. Promote subject enhanceexcellence.
3. To work towards excellence, one must know where he is. Our present state... An introspective analysis.Our faculties within.

Unit 2

4. The play of the mind. Emotions – convert weakness into strength.
5. The indispensable role of the intellect. How to achieve and apply clear thinking?
6. The quagmire of thought.The doctrine of Karma – Law of Deservance.
7. Increase Productivity, reduce stress.. work patterning.

Unit 3

8. The art of right contact with the world. assessment, expectations.
9. Myths and Realities on key issues like richness, wisdom, spirituality.
10. Collect yourself, there is no time to waste. The blue-print of perfect action.

REFERENCES:

The Bhaja Govindam and the Bhagavad Gita.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

OBJECTIVES:

This course offers a journey of exploration through the early developments in India of astronomy, mathematics, technologies and perspectives of the physical world. With the help of many case studies, the students will be equipped to understand concepts as well as actual techniques.

Syllabus Unit**1**

1. General introduction: principles followed and sources;
2. Astronomy & mathematics from the Neolithic to the Indus civilization;
3. Astronomy & mathematics in Vedic literature;
4. Vedanga Jyotisha and the first Indian calendars;
5. Shulba Sutras and the foundations of Indian geometry;

Unit 2

1. Astronomy & mathematics in Jain and Buddhist literature;
2. The transition to the Siddhantic period; Aryabhata and his time;
3. The Aryabhatiya: concepts, content, commentaries;
4. Brahmagupta and his advances;
5. Other great Siddhantic savants;
6. Bhaskara II and his advances;

Unit 3

1. The Kerala school of mathematics;
2. The Kerala school of astronomy;
3. Did Indian science die out?;
4. Overview of recent Indian scientists, from S. Ramanujan onward;
5. Conclusion: assessment and discussion;

TEXTBOOK:

Indian Mathematics and Astronomy: Some Landmarks, by S. Balachandra Rao

REFERENCE:

IFIH's interactive multimedia DVD on Science & Technology in Ancient India.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

OBJECTIVES:

This course offers the foundation necessary to understand Eastern approaches to psychology and spirituality. The course includes experiential components centering on meditation and spiritual practice.

Syllabus Unit**1**

Introduction

Introduction to Modern Psychology

A short history of Modern Psychology - Major Schools of Modern Psychology - The three major forces in Western Psychology - Freudian Psychoanalysis; Behaviourism; Humanistic Psychology.

Introduction to Indian Psychology

What is Yoga? - Rise of Yoga Psychology tradition - Various schools of Yoga Psychology - Universal Goal of all Yoga-schools.

Patanjali Yoga Sutra – 1

Introduction to Rishi Patanjali - Bird view of Yoga-Sutra - Definition of Yoga – Vrittis.

Patanjali Yoga Sutra – 2

Five Kinds of Vrittis - Pramanam - sources of right knowledge - Viparyayah – unfolded belief - Vikalpah – Unfolded belief - Smriti – Memory.

Unit 2

Patanjali Yoga Sutra – 3

Two formulae - Necessity of Abhyasah and Vairagyah - Foundation of Abhyasah - Foundation of Vairagyah.

Patanjali Yoga Sutra – 4

Introduction to Samadhi - Samprajnata-Samadhi - Reasoning in Samprajnata-Samadhi - Reflection in Samprajnata-Samadhi - Bliss in Samprajnata-Samadhi - Sense of Individuality in Samprajnata-Samadhi.

Patanjali Yoga Sutra – 5

Main obstacles in the path of Yoga - other obstructions - removal of obstacles by one – pointedness; by controlling Prana - by observing sense experience - by inner illumination - by detachment from matter - by knowledge of dream and sleep - by meditation as desired.

Patanjali Yoga Sutra – 6

How to make mind peaceful? - Cultivating opposite virtues: happiness – friendliness - misery – compassion - virtue – gladness - vice – indifference.

Patanjali Yoga Sutra – 7

Five causes of Pain - avidya – ignorance (Root Cause) - asmita – ‘I-Feeling’ – raga – attraction - dwesha – repulsion - abhinivesha – clinging to life.

Unit 3

Patanjali Yoga Sutra – 8

Necessity of Yoga practice - eight parts of Yoga practice - five Yamas: ahimsa – satya – asteya – brahmacharyam – aparigraha.

Patanjali Yoga Sutra – 9

Five Niyamas: Soucha – Santhosha – Tapas – Swadyah – Ishwara - Pranidhanam.

Patanjali Yoga Sutra – 10

Asanam – Pranayamah - various kinds of Pranayamah - Pratyaharah - Mastery over the senses. Report review Conclusion

REFERENCES:

1. *The course book will be “The four chapters of Freedom” written by Swami Satyananda Saraswati of Bihar School of Yoga, Munger, India.*
2. *“The message of Upanishads” written by Swami Ranganathananda. Published by Bharathiya Vidya Bhavan.*
3. *Eight Upanishads with the commentary of Sankaracharya, Translated by Swami Gambhirananda, Published by Advaita Ashram, Uttaranjal.*
4. *‘Hatha Yoga Pradipika’ Swami Muktibodhananda, Yoga Publications Trust, Munger, Bihar, India*

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

OBJECTIVES:

To introduce business vocabulary; to introduce business style in writing and speaking; to expose students to the cross-cultural aspects in a globalised world; to introduce the students to the art of persuasion and negotiation in business contexts.

Course Outcomes

- CO1: Familiarize and use appropriate business vocabulary and etiquettes in verbal communication in the professional context
 CO2: Understand organizational structures, pay structures and performance assessments
 CO3: Apply language skills in drafting various business documents and other necessary communications in the business context
 CO4: Understand and address cross cultural differences in the corporate environment
 CO5: Participate in planned and extempore enactments of various business situations

CO-PO Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2									1		1	
CO3										3		
CO4						2						
CO5									2			

Syllabus Unit**1**

Business Vocabulary - Writing: Drafting Notices, Agenda, and Minutes - Reading: Business news, Business articles.

Unit 2

Writing: Style and vocabulary - Business Memorandum, letters, Press Releases, reports – proposals – Speaking: Conversational practice, telephonic conversations, addressing a gathering, conducting meetings.

Unit 3

Active Listening: Pronunciation – information gathering and reporting - Speaking: Cross-Cultural Issues, Group Dynamics, negotiation & persuasion techniques.

Activities

Case studies & role-plays.

BOOKS RECOMMENDED:

1. Jones, Leo & Richard Alexander. *New International Business English*. CUP. 2003.
2. Horner, David & Peter Strutt. *Words at Work*. CUP. 1996.
3. Levi, Daniel. *Group Dynamics for Teams*. 3 ed. Sage Publications India Pvt. Ltd. New Delhi, 2011.
4. Owen, Roger. *BBC Business English*. BBC. 1996.
5. Henderson, Greta Lafollette & Price R Voiles. *Business English Essentials*. 7th Edition. Glencoe / McGrawHill.
6. Sweeney, Simon. *Communicating in Business*. CUP. 2000.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

OBJECTIVES:

To expose the students to the greatness of Indian Thought in English; to develop a sense of appreciation for the lofty Indian Thought; to develop an understanding of the eclectic Indian psyche; to develop an understanding about the societal changes in the recent past.

Syllabus Unit**1 Poems**

Rabindranath Tagore's Gitanjali (1-10); Nizzim Ezekiel's Enterprise; A.K. Ramanujam's Small-Scale Reflections on a Great House.

Unit 2**Prose**

Khushwant Singh's The Portrait of a Lady; Jhumpa Lahiri's Short Story - Interpreter of Maladies.

Unit 3**Drama and Speech**

Vijay Tendulkar's Silence, the Court is in Session; Motivational speeches by Jawaharlal Nehru/ S. Radhakrishnan / A. P. J. Abdul Kalam's My Vision for India etc. (any speech).

REFERENCES:

1. Lahiri, Jhumpa. *Interpreter of Maladies*, Harper Collins Publications, 2000.
2. Ramanujan A. K. ed. K. M. George, *Modern Indian Literature: An Anthology*, Vol. I, Sahitya Akademi, 1992.
3. Singh, Khushwant. *The Portrait of a Lady: Collected Stories*, Penguin, 2009.
4. Tagore, Rabindranath. *Gitanjali*, Penguin Books India Pvt. Ltd, 2011.
5. Tendulkar, Vijay. *Five Plays*, Oxford University Press, 1996.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

OBJECTIVES:

To expose the students to different genres of Literature; to hone reading skills; to provide deeper critical and literary insights; to enhance creative thinking; to promote aesthetic sense.

Syllabus Unit**1 Poems**

1. W. H. Auden: Refugee Blues; 2. A. K. Ramanujan: Obituary; 3. William Blake: The Little Black Boy; 4. Gieve Patel: Grandparents at a Family Get-together.

Unit 2**Short Stories**

1. Chinua Achebe: Marriage is a Private Affair; 2. Ruskin Bond: The Thief; 3. Isai Tobolsky: Not Just Oranges; 4. K. A. Abbas: The Refugee

Unit 3**Prose**

1. A. G. Gardiner: On The Philosophy of Hats; 2. Robert Lynd: Mispronunciation

Practicals:

Role plays: The Proposal, Chekov / Remember Ceaser, Gordon Daviot / Final Solutions, Mahesh Dattani, Bookreviews, Movie reviews.

SUGGESTED READING:

The Old Man and the Sea, Hemingway / Any one of the novels of R.K. Narayan, etc.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

OBJECTIVES:

To introduce the students to the elements of technical style; to introduce the basic elements of formal correspondence; to introduce technical paper writing skills and methods of documentation; to improve oral presentation skills in formal contexts.

Course Outcomes:

After the completion of the course the student will be able to:

CO1: Understand and use the basic elements of formal correspondence and methods of documentation

CO2: Learn to edit technical content for grammatical accuracy and appropriate tone and style

CO3: Use the library and internet resources for research purposes

CO4: Demonstrate the ability to communicate effectively through group mock-technical presentations and other activities

Mapping of course outcomes with program outcomes:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11 PSO2	PO12	PSO1	
CO1										3				
CO2										3				
CO3				1										
CO4									3	3				

Syllabus:**Unit 1**

Mechanics of writing: Grammar rules – punctuation - spelling rules - tone and style - graphical Representation.

Unit 2

Different kinds of written documents: Definitions – descriptions – instructions – recommendations - manuals -reports – proposals; Formal Correspondence: Letter Writing including job applications with Resume.

Unit 3

Technical paper writing: Library research skills - documentation style - document editing – proof reading –formatting.

Practice in oral communication and Technical presentations

REFERENCES:

1. Hirsh, Herbert. L. *“Essential Communication Strategies for Scientists, Engineers and Technology Professionals”*. II Edition. New York: IEEE press, 2002
2. Anderson, Paul. V. *“Technical Communication: A Reader-Centred Approach”*. V Edition. Harcourt Brace College Publication, 2003
3. Strunk, William Jr. and White. E B. *“The Elements of Style”* New York. Alliyen & Bacon, 1999.
4. Riordan, G. Daniel and Pauley E. Steven. *“Technical Report Writing Today”* VIII Edition (Indian Adaptation). New Delhi: Biztantra, 2004.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

OBJECTIVES:

To help the students learn the fine art of story writing; to help them learn the techniques of story telling; to help them study fiction relating it to the socio- cultural aspects of the age; to familiarize them with different strategies of reading short stories; to make them familiar with the morals and values held in high esteem by the ideals of Indianness.

Syllabus Unit**1**

Introduction: Differences between novel and short stories – origin and development of short stories - Rabindranath Tagore: Kabuliwallah; Mulk Raj Anand: The Gold Watch.

Unit 2

R. K. Narayan: Sweets for Angels; K. A. Abbas: The Refugee; Khushwant Singh: The Mark of Vishnu.

Unit 3

Masti Venkatesha Iyengar: The Curds-Seller; Manohar Malgonkar: Upper Division Love; Romila Thapar: The Spell; Premchand: The Voice of God.

TEXT:

M. G. Narasimha Murthy (ed), Famous Indian Stories. Hyderabad: Orient Black Swan, 2014

REFERENCE:

Mohan Ramanan (Ed), English and the Indian Short Story: Essays in Criticism, Hyderabad, Orient Black Swan, 2000.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus Unit**1****Population - Identity**

How to introduce yourself (name, age, address, profession, nationality); Numbers; How to ask questions; Grammar – Pronouns - subjects; Regular verbs of 1st group (er) in the present; Être (to be) and avoir (to have) in the present; Interrogative sentence; Gender of adjectives.

Unit 2**The suburbs - At the train station**

Introduce someone; Buy a train ticket or a cinema ticket; Ask for information; Official time; Ask for a price; The city (church, town hall, post office...)

Grammar – Pronouns - subjects (continuation); Gender of adjectives (continuation); Plural of nouns and adjectives; Definite and indefinite articles; Interrogative adjectives; I would like (Je voudrais).

Unit 3**Paris and the districts - Looking for a room**

Locate a room and indicate the way; Make an appointment; Give a price; Ordinal numbers; Usual time; Ask for the time.

Grammar - Imperative mode; Contracted articles (au, du, des); negation.

TEXTBOOK:

Metro St Michel - Publisher: CLE international

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

SyllabusUnit**1****The first room of a student**

A party to celebrate the 1st room; Description of a room; furniture; Locate objects: prepositions (devant, derrière, dans...), Read advertisement; Appreciation (I like, I prefer,).

Grammar - Perfect past tense with avoir; Possessive adjectives (mon, ton, son...); Demonstrative adjectives (ce, cet, cette); Yes (oui, si).

Unit 2 Small**jobs**

Conversation on the phone; Give Time indications; Answer a job offer; Describe a job; Suggest a meeting time. Grammar - Perfect past tense with être and avoir (continuation); Possessive adjectives (notre, votre, leur); Prepositions (à, pour, avec ...); Pronoun as direct object (le, la, l', les).

Unit 3**University Restaurant**

Inquiry; Express an opinion; Ask questions (continuation); Food, meals, taste, preferences; Nutrition, diet, choose a menu or diet, Expression of quantities (beaucoup, peu).

Grammar - Partitif (expressing quantity) (du, de la, pas de....); Comparison (plus...que, moins....que, autant...que); Interrogation (continuation), inversion, Est-ce que, qu'est-ce que?.

TEXTBOOK:

Metro St Michel - Publisher: CLE International

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus

Unit 1

Greetings; Introducing one-self (formal and informal context), saying their name, origin, living place, occupation. Numbers 1-100; Saying the telephone number. Countries and Languages.

Grammar: Structure – W - Questions and Yes/No questions and statements, personal pronouns, verb conjugations. Articles.

Vocabulary: Professions.

Unit 2

Giving the personal details. Name, age, marital status, year of birth, place of birth, etc. Numbers till 1000. Saying a year. Alphabets – spelling a word.

Filling up an application form; In the restaurant – making an order.

Grammar: Definite, indefinite and negative article in nominative. Accusative: indefinite and negative Article Vocabulary: Food items

Unit 3

Numbers above 1000. Orientation in Shopping plazas: asking the price, where do I find what, saying the opinion. Grammar: Accusative – definite article. Adjectives and plural forms. Vocabulary: Furniture and currencies.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus**Unit 1**

Shopping and orientation in supermarket; Conversation between the customer and salesman; Where one finds what in supermarket; Asking for requests and suggestions.

Grammar: Dative of personal pronouns. Imperative form. Vocabulary: Consumables and measurements;

Unit 2

Appointments; Work and leisure time activities; Time, weekdays, months and seasons; saying the date; fixing up an appointment.

Grammar: Model verbs; Prepositions with time and place; Ordinal numbers. Vocabulary: Leisure activities, weekdays, months and seasons.

Unit 3

Family and household; Family and relations; household and daily routine. Grammar: Possessive articles; Divisible and indivisible verbs.

Vocabulary: Family circle; Household articles.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus

To have an elementary exposure to German language; specifically

1. to have some ability to understand simple spoken German, and to be able to speak it so as to be able to carry on life in Germany without much difficulty (to be able to do shopping, etc.);
2. to be able to understand simple texts, and simple forms of written communication;
3. to have a basic knowledge of German grammar;
4. to acquire a basic vocabulary of 500 words;
5. to be able to translate simple letters with the use of a dictionary; and
6. to have some familiarity with the German life and culture.

(This will not be covered as part of the regular classroom teaching; this is to be acquired by self-study.) Some useful websites will be given.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus

The basic vocabulary and grammar learned in the earlier course is mostly still passive knowledge. The endeavour of this course is to activate this knowledge and develop the skill of communication.

Topics are: Airport, railway station, travelling; shopping; invitations, meals, meeting people; around the house; the human body; colours; professions.

Past and future tenses will be introduced. Applying genitive, dative and accusative. Some German culture. Films.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus

Unit 1

Emotional Intelligence: Concept of Emotional Intelligence, Understanding the history and origin of Emotional Intelligence, Contributors to Emotional Intelligence, Science of Emotional Intelligence, EQ and IQ, Scope of Emotional Intelligence.

Unit 2

Components of Emotional Intelligence: Self-awareness, Self-regulation, Motivation, Empathy, Social skills. Emotional Intelligence Competencies, Elements of Emotional Intelligence, Models of Emotional Intelligence: The Ability-based Model, The Trait Model of Emotional Intelligence, Mixed Models of Emotional Intelligence.

Unit 3

Emotional Intelligence at Work place: Importance of Emotional Intelligence at Work place? Cost-savings of Emotional Intelligence, Emotionally Intelligent Leaders, Case Studies Measuring Emotional Intelligence: Emotionally Intelligence Tests, Research on Emotional Intelligence, Developing Emotional Intelligence.

REFERENCES:

1. Daniel Goleman (1996). *Emotional Intelligence- Why it can Matter More than IQ*. Bantam Doubleday Dell Publishing Group
2. Daniel Goleman (2000). *Working with Emotional Intelligence*. Bantam Doubleday Dell Publishing Group
3. Liz Wilson, Stephen Neale & Lisa Spencer-Arnell (2012). *Emotional Intelligence Coaching*. Kogan Page India Private Limited

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

23HUM231

GLIMPSES INTO THE INDIAN MIND -THE GROWTH OF MODERN INDIA

L-T-P-C: 2-0-0-2

Syllabus Unit 1

Introduction

General Introduction; 'His + Story' or 'History' ?; The concepts of 'nation', 'national identity' and 'nationalism'; Texts and Textualities: Comparative Perspectives.

Unit 2

Selected writings / selections from the complete works of the following authors will be taken up for study in achronological order:

Raja Ram Mohan Roy; Dayananda Saraswati; Bal Gangadhar Tilak; Rabindranath Tagore;

Unit 3

Selected writings / selections from the complete works of the following authors will be taken up for study in achronological order:

Swami Vivekananda; Sri Aurobindo; Ananda K. Coomaraswamy; Sister Nivedita; Mahatma Gandhi; Jawaharlal Nehru; B.R. Ambedkar; Sri Chandrasekharendra Saraswati, the Paramacharya of Kanchi; Dharampal; Raja Rao; V.S. Naipaul.

Conclusion.

REFERENCES:

1. Tilak, Bal Gangadhar. *The Orion / Arctic Home in the Vedas*.
2. Tagore, Rabindranath. *The History of Bharatavarsha / On Nationalism / Greater India*.
3. Vivekananda, Swami. "Address at the Parliament of Religions" / "The Future of India" / "In Defence of Hinduism" from *Selections from the Complete Works of Swami Vivekananda*.
4. Aurobindo, Sri. *The Renaissance in India / On Nationalism*.
5. Coomaraswamy, Ananda K. *Essays in Indian Idealism (any one essay) / Dance of Shiva*.
6. Nivedita, Sister. "Noblesse Oblige: A Study of Indian Caste" / "The Eastern Mother" from *The Web of Indian Life*.
7. Gandhi, Mahatma. *Hind Swaraj*.
8. Nehru, Jawaharlal. "The Quest" from *Discovery of India*.
9. Ambedkar, B. R. "Buddha and His Dhamma" from *Collected Works*.
10. Saraswati, Chandrasekharendra. "The Sastras and Modern Life" from *The Hindu Dharma*.
11. Dharampal. *Bharatiya Chitta, Manas and Kala / Understanding Gandhi*.
12. Naipaul, V. S. *India: A Wounded Civilization / India: A Million Mutinies Now*.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus

Unit 1

Introduction

A peep into India's glorious past

Ancient India – the vedas, the vedic society and the Sanatana Dharma – rajamandala and the Cakravartins – Ramarajya – Yudhisthira's ramarajya; Sarasvati - Sindhu Civilization and the myth of the Aryan Invasion; Classical India – Dharma as the bedrock of Indian society – Vaidika Brahmanya Dharma and the rise of Jainism and Buddhism

– the sixteen Mahajanapadas and the beginning of Magadhan paramountcy - Kautilya and his Arthasastra – Chandragupta Maurya and the rise of the Mauryan empire – Gupta dynasty Indian art and architecture – classical sanskrit literature – Harsavardhana; Trade and commerce in classical and medieval India and the story of Indiansupremacy in the Indian ocean region; The coming of Islam – dismantling of the traditional Indian polity – the Mughal empire – Vijayanagara samrajya and days of Maratha supremacy.

Unit 2

India's contribution to the world: spirituality, philosophy and sciences

Indian Philosophy – the orthodox (Vaidika) and the heterodox (atheistic) schools; Ramayana and Mahabharata; Bhagavad Gita; Saints and sages of India; Ancient Indian medicine: towards an unbiased perspective; Ancient Indian mathematics; Ancient Indian astronomy; Ancient Indian science and technology.

The arrival of Europeans, British paramountcy and colonization

What attracted the rest of the world to India?; India on the eve of the arrival of European merchants; The story of colonization and the havoc it wrecked on Indian culture and civilization; Macaulay and the start of the distortion of Indian education and history; Indian economy – before and after colonization: a brief survey; The emergence of modern India.

Unit 3

Women in Indian society

The role and position of women in Hindu civilization; Gleanings from the Vedas, Brihadarnyaka Upanishad, Saptasati Devi Mahatmyam, Ramayana, Mahabharata, Manusmriti, Kautilya's Arthasastra and Mrichchhakatikam of Sudraka; The role and position of Indian women vis-a-vis Islam and European cultures; The great women of India.

Modern India

The national movement for freedom and social emancipation; Swami Vivekananda, Sri Aurobindo, Rabindranath Tagore; Understanding Mahatma Gandhi; A new nation is born as a republic – the pangs of birth and growth; India since Independence – the saga of socio-political movements; Problems facing the nation today; Globalization and Indian Economy; Bharatavarsha today and the way ahead: Regeneration of Indian National Resources.

Conclusion

The Wonder that was India; The 'politics' and 'purpose' of studying India.

REFERENCES:

1. Parameswaran, S. *The Golden Age of Indian Mathematics*. Kochi: Swadeshi Science Movement.
2. Somayaji, D. A. *A Critical Study of Ancient Hindu Astronomy*. Dharwar: 1972.
3. Sen, S. N. & K. V. Sarma eds. *A History of Indian Astronomy*. New Delhi, 1985.
4. Rao, S. Balachandra. *Indian Astronomy: An Introduction*. Hyderabad: Universities Press, 2000.
5. Bose, D. M. et. al. *A Concise History of Science in India*. New Delhi: 1971.
6. Bajaj, Jitendra & M. D. Srinivas. *Indian Economy and Polity*. Chennai: Centre for Policy Studies.
7. Bajaj, Jitendra & M. D. Srinivas. *Timeless India, Resurgent India*. Chennai: Centre for Policy Studies.
8. Joshi, Murli Manohar. *Science, Sustainability and Indian National Resurgence*. Chennai: Centre for Policy Studies, 2008.
9. *The Cultural Heritage of India*. Kolkata: Ramakrishna Mission Institute of Culture.
10. Vivekananda, Swami. *Selections from the Complete Works of Swami Vivekananda*. Kolkata: Advaita Ashrama.
11. Mahadevan, T. M. P. *Invitations to Indian Philosophy*. Madras: University of Madras.
12. Hirianna, M. *Outlines of Indian Philosophy*. Motilal Banarsidass.
13. Tagore, Rabindranath. *The History of Bharatavarsha / On Nationalism / Greater India*.
14. Majumdar, R. C. et. al. *An Advanced History of India*. Macmillan.
15. Mahajan, V. D. *India Since 1526*. New Delhi: S. Chand & Company.
16. Durant, Will. *The Case for India*. Bangalore: Strand Book Stall, 2008.
17. Aurobindo, Sri. *The Indian Renaissance / India's Rebirth / On Nationalism*.
18. Nivedita, Sister. *The Web of Indian Life*. Kolkata: Advaita Ashrama.
19. Durant, Will. *The Story of Civilization. Volume 1 – Our Oriental Heritage*. New York: Simon & Schuster.
20. Ranganathananda, Swami. *Eternal Values for A Changing Society*. Bombay: Bharatiya Vidya Bhavan.
21. Ranganathananda, Swami. *Universal Message of the Bhagavad Gita*. Kolkata: Advaita Ashrama.
22. Seturaman, V. S. *Indian Aesthetics*. Macmillan.
23. Coomaraswamy, Ananda K. *The Dance of Shiva*. New Delhi: Sagar Publications.
24. Coomaraswamy, Ananda K. *Essays on Indian Idealism*. New Delhi: Munshiram Manoharlal.
25. Danino, Michel. *The Invasion That Never Was*.
26. Kautilya. *Arthashastra*.
27. Altekar, A. S. *State and Government in Ancient India*. New Delhi: Motilal Banarsidass.
28. Altekar, A. S. *The Position of Women in Hindu Civilization*. New Delhi: Motilal Banarsidass.
29. Sircar, D. C. *Studies in the Religious Life of Ancient and Medieval India*. New Delhi: Motilal Banarsidass.
30. Sircar, D. C. *Studies in the Political and Administrative Systems in Ancient and Medieval Times*. New Delhi: Motilal Banarsidass.
31. Madhavananda, Swami & R. C. Majumdar eds. *The Great Women of India*. Kolkata: Advaita Ashrama.
32. Dutt, R. C. *The Economic History of India*. London, 1902.
33. Dharampal. *Collected Works*.
34. Dharampal. *Archival Compilations (unpublished)*

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus

Unit 1

Introduction

General Introduction; Primitive man and his modes of exchange – barter system; Prehistoric and proto-historic polity and social organization.

Ancient India – up to 600 B.C.

Early India – the vedic society – the varnashramadharma – socio-political structure of the various institutions based on the four purusharthas; The structure of ancient Indian polity – Rajamandala and Cakravartins – Prajamandala; Socio-economic elements from the two great Epics – Ramayana and Mahabharata – the concept of the ideal King (Sri Rama) and the ideal state (Ramarajya) – Yudhisthira's ramarajya; Sarasvati - Sindhu civilization and India's trade links with other ancient civilizations; Towards chiefdoms and kingdoms – transformation of the polity: kingship – from gopati to bhupati; The mahajanapadas and the emergence of the srenis – states and cities of the Indo-Gangetic plain.

Unit 2

Classical India: 600 B.C. – 1200 A.D.

The rise of Magadha, emergence of new religions – Buddhism and Jainism – and the resultant socio-economic impact; The emergence of the empire – the Mauryan Economy and Kautilya's Arthashastra; of Politics and trade – the rise of the Mercantile Community; Elements from the age of the Kushanas and the Great Guptas; India's maritime trade; Dharma at the bedrock of Indian polity – the concept of Digvijaya: dharma-vijaya, lobha-vijaya and asura-vijaya; Glimpses into the south Indian economies: political economies of the peninsula – Chalukyas, Rashtrakutas and Cholas

Medieval India: 1200 A.D. – 1720 A.D.

Advent of Islam – changes in the social institutions; Medieval India – agrarian economy, non-agricultural production and urban economy, currency system; Vijayanagara samrajya and maritime trade – the story of Indian supremacy in the Indian Ocean region; Aspects of Mughal administration and economy; The Maratha and other provincial economies.

Unit 3

Modern India: 1720 - 1947

the Indian market and economy before the arrival of the European traders; Colonisation and British supremacy (dismantling of everything that was 'traditional' or 'Indian') – British attitude towards Indian trade, commerce and economy and the resultant ruining of Indian economy and business – man-made famines – the signs of renaissance: banking and other business undertakings by the natives (the members of the early Tagore family, the merchants of Surat and Porbander, businessmen of Bombay, etc. may be referred to here) – the evolution of the modern banking system; Glimpses into British administration of India and administrative models; The National movement and nationalist undertakings in business and industry: the Tatas and the Birlas; Modern India: the growth of large-scale industry – irrigation and railways – money and credit – foreign trade; Towards partition – birth of two new nations – division of property; The writing of the Indian Constitution – India becomes a democratic republic – a new polity is in place.

Independent India – from 1947

India since Independence – the saga of socio-political movements; Indian economy since Independence – the fiscal system – the five year plans – liberalisation – the GATT and after; Globalisation and Indian economy; Impact of science and (new/ emerging) technology on Indian economy; Histories of select Indian business houses and business entrepreneurship.

Conclusion

REFERENCES:

1. *The Cultural Heritage of India*. Kolkata: Ramakrishna Mission Institute of Culture. Kautilya. Arthashastra.
2. Altekar, A. S. *State and Government in Ancient India*. New Delhi: Motilal Banarsidass.
3. Sircar, D. C. *Studies in the Political and Administrative Systems in Ancient and Medieval Times*. New Delhi: Motilal Banarsidass.
4. Dutt, R. C. *The Economic History of India*. London, 1902.
5. Dharampal. *Collected Works (Volumes IV & V)*.
6. Dharampal. *Archival Compilations (unpublished)*.
7. Bajaj, Jitendra & M. D. Srinivas. *Indian Economy and Polity*. Chennai: Centre for Policy Studies.
8. Bajaj, Jitendra & M. D. Srinivas. *Timeless India, Resurgent India*. Chennai: Centre for Policy Studies.
9. Joshi, Murli Manohar. *Science, Sustainability and Indian National Resurgence*. Chennai: Centre for Policy Studies, 2008.
10. Tripathi, Dwijendra. *The Oxford History of Indian Business*. New Delhi: Oxford University Press, 2004.
11. McGuire, John, et al, eds. *Evolution of World Economy, Precious Metals and India*. New Delhi: Oxford University Press, 2001.
12. Tripathi, Dwijendra and Jyoti Jumani. *The Concise Oxford History of Indian Business*. New Delhi: Oxford University Press, 2007.
13. Kudaisya, Medha M. *The Life and Times of G. D. Birla*. New Delhi: Oxford University Press, 2003.
14. Raychaudhuri, Tapan and Irfan Haib, eds. *The Cambridge Economic History of India*. Volume 1. New Delhi: Orient Longman, 2004.
15. Kumar, Dharma, ed. *The Cambridge Economic History of India*. Volume 2. New Delhi: Orient Longman, 2005.
16. Sabavala, S. A. and R. M. Lala, eds. *J. R. D. Tata: Keynote*. New Delhi: Rupa & Co., 2004.
17. Mambro, Arvind ed. *J. R. D. Tata: Letters*. New Delhi: Rupa & Co., 2004.
18. Lala, R. M., *For the Love of India: The Life and Times of Jamsetji Tata*. New Delhi: Penguin, 2006.
19. Thapar, Romila. *The Penguin History of Early India: From the Origins to AD 1300*. New Delhi: Penguin, 2002.
20. Majumdar, R. C., et. al. *An Advanced History of India*. Macmillan.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus

Unit 1

Introduction to Health

Health is wealth; Role of lifestyle habits on health; Importance of adolescence; Stages, Characteristics and changes during adolescence; Nutritional needs during adolescence why healthy lifestyle is important for adolescence. Eating Habits - eating disorders, skipping breakfast, junk food consumption.

Practicals - Therapeutic Diets

Unit 2

Food and Nutritional Requirements during Adolescence

Fluid intake; nutrition related problems; lifestyle related problems, Role of physical activity; resting pattern and postures, Personal habits – alcoholism, and other tobacco products, electronic addiction etc

Practicals - Ethnic Foods

Unit 3

Need for a Positive Life Style Change

Peer pressure & procrastination, Stress, depression, suicidal tendency, Mini project review and viva, Whole portions revision.

Practical - Cooking without Fire or Wire-healthy Snacks

TEXTBOOKS:

1. B. Srilakshmi, “Dietetics”, New age international (P) ltd, publishers, 2010.
2. “Nutrient requirement and Recommended Dietary Allowances for Indians”, published by Indian Council of Medical Research, ICMR, 2010.

REFERENCE BOOKS:

1. K Park “Textbook of preventive and social medicine”, 2010.
2. WHO Report on Adolescent Health: 2010

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus**Unit 1**

Introductory study of the Bhagavad Gita and the Upanishads.

Unit 2

The relevance of these classics in a modern age.

Unit 3

Goals of human life - existential problems and their solutions in the light of these classics etc.

REFERENCE:

The Bhagavad Gita, Commentary by Swami Chinmayananda

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

PREAMBLE:

This paper will introduce the students to the multiple dimensions of the contribution of India to the fields of philosophy, art, literature, physical and social sciences. The paper intends to give an insight to the students about the far-reaching contributions of India to world culture and thought during the course of its long journey from the hoary antiquity to the present times. Every nation takes pride in its achievements and it is this sense of pride and reverence towards the achievements that lays the foundation for its all-round progress.

Syllabus Unit**1**

A brief outline of Indian history from prehistoric times to the present times.

Contributions of India to world culture and civilization: Indian Philosophy and Religion; Art and Literature; Physical and Social Sciences.

Unit 2

Modern India: Challenges and Possibilities.

Scientific and technological progress in post-independence era; Socio-cultural and political movements after independence; Challenges before the nation today - unemployment – corruption – degradation of cultural and moral values - creation of a new system of education; Creation of a modern and vibrant society rooted in traditional values.

Unit 3

Modern Indian Writing in English: Trends in Contemporary Indian Literature in English.

TEXTBOOK:

Material given by the Faculty

BACKGROUND LITERATURE:

1. *Selections from The Cultural Heritage of India*, 6 volumes, Ramakrishna Mission Institute of Culture(Kolkata) publication.
2. *Selections from the Complete Works of Swami Vivekananda*, Advaita Ashrama publication.
3. *Invitations to Indian Philosophy*, T. M. P. Mahadevan, University of Madras, Chennai.
4. *Outlines of Indian Philosophy*, M. Hiriyanna, MLBD.
5. *An Advanced History of India*, R. C. Majumdar et al, Macmillan.
6. *India Since 1526*, V. D. Mahajan, S. Chand & Company
7. *The Indian Renaissance*, Sri Aurobindo.
8. *India's Rebirth*, Sri Aurobindo.
9. *On Nationalism*, Sri Aurobindo.
10. *The Story of Civilization, Volume I: Our Oriental Heritage*, Will Durant, Simon and Schuster, New York.

11. *Eternal Values for a Changing Society*, Swami Ranganathananda, Bharatiya Vidya Bhavan.
12. *Universal Message of the Bhagavad Gita*, Swami Ranganathananda, Advaita Ashrama.
13. *Awaken Children: Conversations with Mata Amritanandamayi*
14. *Indian Aesthetics*, V. S. Seturaman, Macmillan.
15. *Indian Philosophy of Beauty*, T. P. Ramachandran, University of Madras, Chennai.
16. *Web of Indian Thought*, Sister Nivedita
17. *Essays on Indian Nationalism*, Anand Kumaraswamy
18. *Comparative Aesthetics, Volume 2*, Kanti Chandra Pandey, Chowkhamba, Varanasi
19. *The Invasion That Never Was*, Michel Danino
20. *Samskara*, U. R. Ananthamurthy, OUP.
21. *Hayavadana*, Girish Karnard, OUP.
22. *Naga-Mandala*, Girish Karnard, OUP.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

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OBJECTIVES:

To familiarize students with Sanskrit language; to introduce students to various knowledge traditions in Sanskrit; to help students appreciate and imbibe India's ancient culture and values.

Syllabus Unit

1
Sanskrit Language – Vakya Vyavahara (प्रथमादीक्षा) - Introduction to Sanskrit language - Devanagari script and Sanskrit alphabet - Vowels and Consonants – Pronunciation - Classification of Consonants – Samyukthakshara Words – Nouns and Verbs - Cases – Introduction to Numbers and Time – Verbs: Singular, Dual and Plural – SarvaNamas: First Person, Second Person, Third Person – Tenses: Past, Present and Future -Words for Communication – Selected Slokas – Moral Stories – Subhashithas – Riddles.

Unit 2

Language Studies - Role of Sanskrit in Indian & World Languages.

Unit 3

Introduction to Sanskrit Classical Literature – Kavya Tradition – Drama Tradition - Stotra Tradition – Panchatantra Stories.

Unit 4

Introduction to Sanskrit Technical Literature – Astronomy – Physics – Chemistry – Botany – Engineering – Aeronautics – Ayurveda – Mathematics – Medicine – Architecture - Tradition of Indian Art – Administration – Agriculture.

Unit 5

Indology Studies – Perspectives and Innovations.

TEXTBOOKS AND REFERENCE BOOKS:

1. Vakya Vyavahara- Prof. Vempaty Kutumba Sastri, Rashtriya Sanskrit Sansthan, New Delhi
2. The Wonder that is Sanskrit - Dr.Sampadananda Mishra, New Delhi
3. Science in Sanskrit – Samskritha Bharathi, New Delhi

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
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Syllabus

Unit 1

Introduction to Basic Concepts of NSS: History, philosophy, aims and objectives of NSS, Emblem, flag, motto, song, badge etc., Organisational structure, roles and responsibilities of various NSS functionaries.

NSS Programmes and Activities: Concept of regular activities, special campaigning, Day Camps, Basis of adoption of village / slums, methodology of conducting survey, financial pattern of the scheme, other youth programme/schemes of GOI, Coordination with different agencies, Maintenance of the Diary.

Unit 2

Volunteerism and Shramdan: Indian Tradition of volunteerism, Needs and importance of volunteerism, Motivation and Constraints of volunteerism, Shramdan as part of volunteerism, Amalabharatam Campaign, Swatch Bharath.

Unit 3

Understanding youth: Definition, profile and categories of youth, Issues, challenges and opportunities for youth, Youth as an agent of social change.

Youth and Yoga: History, philosophy and concept of Yoga, Myths and misconceptions about Yoga, Different Yoga traditions and their impacts, Yoga as a preventive and curative method, Yoga as a tool for healthy life style

Unit 4

Youth Development Programmes in India: National Youth Policy, Youth development programmes at the national level, state level and voluntary sector, youth-focused and youth-led organizations.

Youth and Crime: Sociological and psychological factors influencing youth crime, Peer mentoring in preventing crimes, Awareness about Anti-Ragging, Cyber Crime and its prevention, Juvenile Justice.

Unit 5

Environmental Issues: Environment conservation, enrichment and sustainability, climate change, waste management, rain water harvesting, energy conservation, waste land development.

Project Work / Practical

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Course Objectives

1. To help students acquire the basic knowledge of behavior and effective living
2. To create an awareness of the hazards of health compromising behaviours
3. To develop and strengthen the tools required to handle the adversities of life

Course Outcome

CO 1: Understand the basic concepts of Behavioral

Psychology
CO 2: Demonstrate self reflective skills through activities

CO 3: Apply the knowledge of psychology to relieve stress

CO 4: Analyse the adverse effects of health compromising behaviours.

CO 5: Evaluate and use guided techniques to overcome and cope with stress related problems.

CO-PO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						1						1
CO2						2	3		3	3		
CO3						3	3	2	1		3	2
CO4						2	2	3				1
CO5						1	2				1	1

Syllabus

Unit 1

Self-Awareness & Self-Motivation

Self analysis through SWOT, Johari Window, Maslow's hierarchy of motivation, importance of self esteem and enhancement of self esteem.

Unit 2

The Nature and Coping of Stress

Conflict, Relationship issues, PTSD. Stress – stressors – eustress - distress, coping with stress, stress management techniques.

Unit 3

Application of Health Psychology

Health compromising behaviours, substance abuse and addiction.

TEXTBOOKS:

1. V. D. Swaminathan & K. V. Kaliappan “*Psychology for effective living - An introduction to Health*
2. *Psychology*. 2nd edition Robert J. Gatchel, Andrew Baum & David S. Krantz, McGraw Hill.

REFERENCE BOOKS:

1. S. Sunder, ‘*Textbook of Rehabilitation*’, 2nd edition, Jaypee Brothers, New Delhi. 2002.
2. Weiben & Lloyd, ‘*Psychology applied to Modern Life*’, Thompson Learning, Asia Ltd.2004.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Course Objectives:

1. To strengthen the fundamental knowledge of human behavior
2. To strengthen the ability to understand the basic nature and behavior of humans in organizations as a whole
3. To connect the concepts of psychology to personal and professional life

Course Outcome

CO 1: Understand the fundamental processes underlying human behavior such as learning, motivation, individual differences, intelligence and personality.

CO 2: Apply the principles of psychology in day-to-day life for a better understanding of oneself and others. CO 3: Apply the knowledge of Psychology to improve study skills and learning methods

CO 4: Apply the concepts of defense mechanisms to safeguard against abusive relationships and to nurture healthy relationships.

CO-PO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						3	3		3	2		1
CO2						3	3	2	3	3	1	2
CO3										2	1	
CO4							3		2	2		2

Syllabus**Unit 1**

Psychology of Adolescents: Adolescence and its characteristics.

Unit 2

Learning, Memory & Study Skills: Definitions, types, principles of reinforcement, techniques for improving study skills, Mnemonics.

Unit 3

Attention & Perception: Definition, types of attention, perception.

TEXTBOOKS:

1. S. K. Mangal, "General Psychology", Sterling Publishers Pvt. Ltd. 2007
2. Baron A. Robert, "Psychology", Prentice Hall of India. New Delhi 2001

REFERENCE BOOKS:

1. *Elizabeth B. Hurlock, Developmental Psychology - A life span approach, 6th edition.*
2. *Feldman, Understanding Psychology, McGraw Hill, 2000.*
3. *Clifford Morgan, Richard King, John Scholper, "Introduction to Psychology", Tata Mcgraw Hill, PvtLtd 2004.*

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
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*Continuous Assessment (CA)	20	
End Semester		50

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Syllabus

Unit 1

Introduction

Western and Indian views of science and technology

Introduction; Francis Bacon: the first philosopher of modern science; The Indian tradition in science and technology: an overview.

Unit 2

Indian sciences

Introduction; Ancient Indian medicine: towards an unbiased perspective; Indian approach to logic;

The methodology of Indian mathematics; Revision of the traditional Indian planetary model by

Nilakantha Somasutvan in circa 1500 AD

Science and technology under the British rule

Introduction; Indian agriculture before modernization; The story of modern forestry in India; The building of New Delhi

Unit 3

Science and technology in Independent India

Introduction; An assessment of traditional and modern energy resources; Green revolution: a historical perspective; Impact of modernisation on milk and oilseeds economy; Planning without the spirit and the determination.

Building upon the Indian tradition

Introduction; Regeneration of Indian national resources; Annamahatmyam and Annam Bahu Kurvita: recollecting the classical Indian discipline of growing and sharing food in plenty and regeneration of Indian agriculture to ensure food for all in plenty.

Conclusion

REFERENCES:

1. Joseph, George Gheverghese. *The Crest of the Peacock: Non-European Roots of Mathematics*. London: Penguin (UK), 2003.
2. Iyengar, C. N. Srinivasa. *History of Hindu Mathematics*. Lahore: 1935, 1938 (2 Parts).
3. Amma, T. A. Saraswati. *Geometry in Ancient and Medieval India*. Varanasi: Motilal Banarsidass, 1979.
4. Bag, A. K. *Mathematics in Ancient and Medieval India*. Varanasi: Motilal Banarsidass, 1979.
5. Sarma K. V. & B. V. Subbarayappa. *Indian Astronomy: A Source-Book*. Bombay: Nehru Centre, 1985.
6. Sriram, M. S. et. al. eds. *500 Years of Tantrasangraha: A Landmark in the History of Astronomy*. Shimla: Indian Institute of Advanced Study, 2002.
7. Bajaj, Jitendra & M. D. Srinivas. *Restoring the Abundance: Regeneration of Indian Agriculture to Ensure Food for All in Plenty*. Shimla: Indian Institute of Advanced Study, 2001.
8. Bajaj, Jitendra ed. *Report of the Seminar on Food for All: The Classical Indian Discipline of Growing and Sharing Food in Plenty*. Chennai: Centre for Policy Studies, 2001.

9. Bajaj, Jitendra & M. D. Srinivas. *Annam Bahu Kurvita: Recollecting the Indian Discipline of Growing and Sharing Food in Plenty*. Madras: Centre for Policy Studies, 1996.
10. Parameswaran, S. *The Golden Age of Indian Mathematics*. Kochi: Swadeshi Science Movement.
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18. *The Cultural Heritage of India*. Kolkata: Ramakrishna Mission Institute of Culture.

* The syllabus and the study material in use herein has been developed out of a 'summer programme' offered by the Centre for Policy Studies (CPS), Chennai at the Indian Institute of Advanced Study (IIAS), Rashtrapati Nivas, Shimla, sometime ago. The same has been very kindly made available to us by Professors Dr M.D. Srinivas (Chairman) and Dr J.K. Bajaj (Director) of the CPS.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports.

Syllabus**Unit 1**

Introduction: Relevance of Bhagavad Gita today – Background of Mahabharatha.

Arjuna Vishada Yoga: Arjuna's Anguish and Confusion – Symbolism of Arjuna's

Chariot.

Sankhya Yoga: Importance of Self-knowledge – Deathlessness: Indestructibility of Consciousness – Being Established in Wisdom – Qualities of a Sthita-prajna.

Unit 2

Karma Yoga: Yoga of Action – Living in the Present – Dedicated Action without Anxiety over Results - Concept of Swadharma.

Dhyana Yoga: Tuning the Mind – Quantity, Quality and Direction of Thoughts – Reaching Inner Silence.

Unit 3

Bhakti Yoga: Yoga of Devotion – Form and Formless Aspects of the Divine – Inner Qualities of a True Devotee.

Gunatraya Vibhaga Yoga: Dynamics of the Three Gunas: Tamas, Rajas, Sattva – Going Beyond the Three Gunas – Description of a Gunatheetha.

TEXTBOOKS / REFERENCES:

1. Swami Chinmayananda, *"The Holy Geeta"*, Central Chinmaya Mission Trust, 2002.
2. Swami Chinmayananda, *"A Manual of Self Unfoldment"*, Central Chinmaya Mission Trust, 2001.

Evaluation Pattern

Assessment	Internal	End Semester
Periodical 1 (P1)	15	
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OBJECTIVES:

To give students an introduction to the basic ideas contained in the Upanishads; and explores how their message can be applied in daily life for achieving excellence.

Syllabus Unit**1**

An Introduction to the Principal Upanishads and the Bhagavad Gita - Inquiry into the mystery of nature - Sruti versus Smriti - Sanatana Dharma: its uniqueness - The Upanishads and Indian Culture - Upanishads and Modern Science.

Unit 2

The challenge of human experience & problems discussed in the Upanishads – the True nature of Man – the Moving power of the Spirit – The Message of Fearlessness – Universal Man - The central problems of the Upanishads – Ultimate reality – the nature of Atman - the different manifestations of consciousness.

Unit 3

Upanishad Personalities - episodes from their lives and essential teachings: Yajnavalkya, Aruni, Uddalaka, Pippalada, Satyakama Jabala, Svetaketu, Nachiketas, Upakosala, Chakrayana Ushasti, Raikva, Kapila and Janaka. Important verses from Upanishads - Discussion of Sage Pippalada's answers to the six questions in Prasnopanishad.

REFERENCES:

1. *The Message of the Upanishads by Swami Ranganathananda, Bharatiya Vidya Bhavan*
2. *Eight Upanishads with the commentary of Sankaracharya, Advaita Ashrama*
3. *Indian Philosophy by Dr. S. Radhakrishnan, Oxford University Press*
4. *Essentials of Upanishads by R L Kashyap, SAKSI, Bangalore*
5. *Upanishads in Daily Life, Sri Ramakrishna Math, Mylapore.*
6. *Eternal stories of the Upanishads by Thomas Egenes and Kumuda Reddy*
7. *Upanishad Ganga series – Chinmaya Creations*

Evaluation Pattern

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Course Objectives:

- To introduce the significance of food, nutrients, locally available food resources, synergic food combinations, good cooking methods and importance of diversity in foods
- To understand nutritional imbalances and chronic diseases associated with the quality of food.
- To gain awareness about the quality of food - Organic food, genetically modified food, adulterated food, allergic food, , food poisoning and food safety.
- To understand food preservation processing, packaging and the use of additives.

Course Outcome:

CO1: Acquire knowledge about the various food and food groups

CO2: Understand nutritional imbalances and chronic diseases prevailing among different age groups.

CO3: Understand the significance of safe food and apply the food safety standards

CO4: Demonstrate skills of food processing, preservation and packaging methods with or without additives

CO5: Evaluate the quality of food based on the theoretical knowledge of Food and Nutrition

CO-PO Mapping:

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		1	1			1	2	1	1	1	1	3
CO 2		1	1			1	1	1	1	1	1	3
CO 3		1	1			1	1	1	1	1	1	3
CO 4		1	1			1	1	1	1	1	1	3
CO 5		1	1			1	2	1	2	1	1	3

Syllabus**Unit 1****Food and Food Groups**

Introduction to foods, food groups, locally available foods, Nutrients, Cooking methods, Synergy between foods, Science behind foods, Food allergies, food poisoning, food safety standards.

Cookery Practicals - Balanced Diet

Unit 2**Nutrients and Nutrition**

Nutrition through life cycle, RDA, Nutrition in disease, Adulteration of foods & Food additives, Packaging and labeling of foods.

Practicals - Traditional Foods

Unit 3

Introduction to Food Biotechnology

Future foods - Organic foods and genetically modified foods, Fortification of food value addition of foods, functional foods, Nutraceuticals, supplementary foods, Processing and preservation of foods, applications of food technology in daily life, and your prospects associated with food industry – Nanoparticles, biosensors, advanced research.

Practicals - Value added foods

TEXTBOOKS:

1. N. Shakuntalamanay, M. Shadaksharaswamy, *“Food Facts and principles”*, New age international (P)ltd, publishers, 2005.
2. B. Srilakshmi, *“Dietetics”*, New age international (P) ltd, publishers, 2010.

REFERENCE BOOKS:

1. B. Srilakshmi, *“Food Science”*, New age international (P) ltd, publishers, 2008.
2. *“Nutrient requirement and Recommended Dietary Allowances for Indians”*, published by Indian Council of Medical Research, ICMR, 2010.

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Syllabus

This paper will introduce the basics of Japanese language. Students will be taught the language through various activities like writing, reading, singing songs, showing Japanese movies etc. Moreover this paper intends to give a thorough knowledge on Japanese scripts that is Hiragana and Katakana. Classes will be conducted throughout in Japanese class only. Students will be able to make conversations with each other in Japanese. Students can make self-introduction and will be able to write letters in Japanese. All the students will be given a text on Japanese verbs and tenses.

Students can know about the Japanese culture and the lifestyle. Calligraphy is also a part of this paper. Informal sessions will be conducted occasionally, in which students can sing Japanese songs, watch Japanese movies, do Origami – pattern making using paper.

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Syllabus

Students will be taught the third and the most commonly used Japanese script, Kanji. Students will be taught to write as well as speak.

Students will be given detailed lectures on Calligraphy.

This version of the course includes a new project where the students should make a short movie in Japanese language selecting their own topics.

By the end of the semester they the students will master the subject in all means. They will be able to speak Japanese as fluently as they speak English. Students will be encouraged to write stories and songs in Japanese language themselves.

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Syllabus

Unit 1

Understanding CSR - Evolution, importance, relevance and justification. CSR in the Indian context, corporate strategy. CSR and Indian corporate. Structure of CSR - In the Companies Act 2013 (Section 135); Rules under Section 13; CSR activities, CSR committees, CSR policy, CSR expenditure CSR reporting.

Unit 2

CSR Practices & Policies - CSR practices in domestic and international area; Role and contributions of voluntary organizations to CSR initiatives. Policies; Preparation of CSR policy and process of policy formulation; Government expectations, roles and responsibilities. Role of implementation agency in Section 135 of the Companies Act, 2013. Effective CSR implementation.

Unit 3

Project Management in CSR initiatives - Project and programme; Monitoring and evaluation of CSR Interventions. Reporting - CSR Documentation and report writing. Reporting framework, format and procedure.

REFERENCES:

1. *Corporate Governance, Ethics and Social Responsibility*, V Bala Chandran and V Chandrasekaran, PHI Learning Private Limited, New Delhi 2011.
2. White H. (2005) *Challenges in evaluating development effectiveness: Working paper 242*, Institute of Development Studies, Brighton.
3. UNDP (nd) *Governance indicators: A users guide*. Oslo: UNDP
4. Rao, Subbha (1996) *Essentials of Human Resource Management and Industrial Relations*, Mumbai, Himalaya
5. Rao, V. S. L. (2009) *Human Resource Management*, New Delhi, Excel Books,

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Syllabus

Unit 1

Mental Health – concepts, definition, Bio-psycho-social model of mental health. Mental health and mental illness, characteristics of a mentally healthy individual, Signs and symptoms of mental health issues, presentation of a mentally ill person. Work place – definition, concept, prevalence of mental health issues in the work place, why invest in workplace mental health, relationship between mental health and productivity, organizational culture and mental health. Case Study, Activity.

Unit 2

Mental Health Issues in the Workplace: Emotions, Common emotions at the workplace, Mental Health issues - Anger, Anxiety, Stress & Burnout, Depression, Addictions – Substance and Behavioural, Psychotic Disorders - Schizophrenia, Bipolar Disorder, Personality disorders. Crisis Situations - Suicidal behavior, panic attacks, reactions to traumatic events. Stigma and exclusion of affected employees. Other issues –work-life balance, Presenteeism, Harassment, Bullying, Mobbing. Mental Health First Aid - Meaning. Case Study, Activity.

Unit 3

Strategies of Help and Care: Positive impact of work on health, Characteristics of mentally healthy workplace, Employee and employer obligations, Promoting mental health and well being- corporate social responsibility (CSR), an inclusive work environment, Training and awareness raising, managing performance, inclusive recruitment, Supporting individuals-talking about mental health, making reasonable adjustments, Resources and support for employees - Employee Assistance Programme / Provider (EAP), in house counsellor, medical practitioners, online resources and telephone support, 24 hour crisis support, assistance for colleagues and care givers, Legislations. Case Study, Activity.

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2. American Psychiatric Association. (2000) [www.ccsa.ca/Eng/KnowledgeCentre/OurDatabases/ Glossary/Pages/index.aspx](http://www.ccsa.ca/Eng/KnowledgeCentre/OurDatabases/Glossary/Pages/index.aspx).
3. Canadian Mental Health Association, Ontario "Workplace mental health promotion, A how to guide" wmhp.cmhaontario.ca/
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5. Government of Western Australia, Mental Health Commission. (2014) "Supporting good mental health in the work place." http://www.mentalhealth.wa.gov.au/Libraries/pdf_docs/supporting_good_mental_health_in_the_workplace_1.sflb.ashx
6. Mental Health Act 1987 (India) www.tnhealth.org/mha.htm
7. Persons with disabilities Act 1995 (India) socialjustice.nic.in
8. The Factories Act 1948 (India) www.caaa.in/Image/19ulabourlawshb.pdf

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