

**RATHNAVEL SUBRAMANIAM COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
SULUR, COIMBATORE – 641 402**

DEPARTMENT OF FOODS AND NUTRITION

B.Sc NUTRITION AND DIETETICS



**Syllabus effective for the students admitted during
the Academic Year 2018– 2019Batch & onwards**

(2018 - 2021)

S. Angeline Esther Preethi

HOD



PRINCIPAL



COE

PROGRAMME OUTCOMES (POs):

PO1	Graduates can have strong fundamentals in their specific discipline along with Digital Strategic knowledge.
PO2	To increase student's ability to communicate effectively with the community /society in verbal /written courage for such as to give or receive clear instruction.
PO3	To enhance their ability to understand and identify the professional and ethical responsibilities.
PO4	To enrich their personality and character development

PROGRAMME SPECIFIC OUTCOMES: (PSOs)

Upon completion of Bachelor of Nutrition and Dietetics Degree, STUDENTS are able to achieve the following outcomes.

No.	Program Specific Outcome
PSO1	To provide a strong foundation in thrust areas of Nutrition and Dietetics to enable them to choose a career in Clinical, Food processing and community sector.
PSO2	To enhance excellent interpersonal skills to promote healthy food choice and to translate the concepts into practice.
PSO3	Upgrade technical skills, numerical skills, define quality procedure using relevant quality tools to evolve food safety system for food industries.
PSO4	To inculcate analytical skills with creative thinking to pursue higher studies, research or entrepreneurial ventures.

GRADUATE ATTRIBUTES

- DISIPLINE KNOWLEDGE
- PROBLEM ANALYSIS
- CRITICAL THINKING
- MODERN TOOLS USAGE
- SOFT SKILLS
- SELF LEARNING
- LIFE LONG LEARNING
- INDIVIDUAL & TEAMWORK
- PROJECT MANAGEMENT & FINANCE

**PROGRAMME: B Sc (Nutrition and Dietetics)
(Effective from the academic year 2018-2019)**

Structure, Credits & Marks Distribution

Sl. No.	Course Type	Number of Courses	Credits	Marks	Total Credits
1	Multi Indian/ International Languages (MIL)	2	4	200	8
2	Ability Enhancement Compulsory Courses (AECC) – (I & II) : Group-I (English)	2	4	200	8
3	Ability Enhancement Compulsory Courses (AECC) –(II & IV) : Group-II	2	1+ 3	200	4
4	Discipline Specific Courses (DSC)	12	6	1200	72
5	Discipline Specific Elective Courses (DSE)	4+1	6	500	30
6	Extra Disciplinary Course (EDC) (DSE)	1	6	100	6
7	Skill Enhancement Courses (SEC)	2+1	4	200	8
8	ALCTA– e Learning in MOOC platform	1	4*	Completion	4*
9	Non Credit Courses – Group I	2	-	Grade	-
10	Non Credit Courses – Group II	6	-	Grade	-
11	Non Credit Courses – Group III	4	-	Completed	-
Total				2600	136 + 4*

Multi-Indian/ International Languages (MIL)								
Course	Course Name	L	T	P	CIA	ESE	Total	Credits
Two courses - Any one group								
Group I								
MIL	Tamil I	6	-	-	25	75	100	4
MIL	Tamil II	6	-	-	25	75	100	4
Group II								
MIL	Hindi I	6	-	-	25	75	100	4
MIL	Hindi II	6	-	-	25	75	100	4
Group III								
MIL	Malayalam I	6	-	-	25	75	100	4
MIL	Malayalam II	6	-	-	25	75	100	4
Group IV								
MIL	French I	6	-	-	25	75	100	4
MIL	French II	6	-	-	25	75	100	4
Group V								
MIL	Arabic I	6	-	-	25	75	100	4
MIL	Arabic II	6	-	-	25	75	100	4
Total							200	8

Ability Enhancement Compulsory Courses(AECC) - Group I : (I & II Semester)								
AECC – G1-I	English I - Grammar and Usage	6	-	-	25	75	100	4
AECC – G1-II	English II – Communicative English	6	-	-	25	75	100	4
Total							200	8

Ability Enhancement Compulsory Courses - Group II (II& IV Semester)								
AECC – G2-I	Environmental Studies	1			100	-	100	1
AECC – G2-II	Aptitude	3			100	-	100	3
Total							200	4

Discipline Specific Courses(DSC)								
DSC – I	Food Science	4		4	25	75	100	6
					40	60		
DSC – II	Chemistry	5	1		25	75	100	6
DSC – III	Human Physiology	5	1		25	75	100	6
DSC – IV	Biochemistry	4		4	25	75	100	6
					40	60		
DSC – V	Principles of Nutrition	4		4	25	75	100	6
					40	60		
DSC – VI	Family Meal Management	4		4	25	75	100	6
					40	60		
DSC – VII	Dietetics	4		4	25	75	100	6
					40	60		
DSC – VIII	Post Harvest Technology	4		4	25	75	100	6
					40	60		
DSC – IX	Food Microbiology	5	1		25	75	100	6
C – X	Community Nutrition	4		4	25	75	100	6
					40	60		

DSC – XI	Food Preservation	4		4	25	75	100	6
					40	60		
DSC – XII	Food Quality Control	4		4	25	75	100	6
					40	60		
Total							1200	72

Discipline Specific Elective Courses(DSE) I : (III Semester)

Course	Course Name	L	T	P	CIA	ESE	Total	Credits
One course –From the group								
DSE – I	Nutrition and Fitness	4	-	4	25	75	100	6
					40	60		
DSE – I	Sports Nutrition	4	-	4	25	75	100	6
					40	60		
Total							100	6

Discipline Specific Elective Courses(DSE) II : (IV Sem)

Course	Course Name	L	T	P	CIA	ESE	Total	Credits
One course–From the group								
DSE – II	Digital Strategies in Nutrition	4	-	4	25	75	100	6
					40	60		
DSE – II	Clinical Food Service	5	1	-	25	75	100	6
Total							100	6

Discipline Specific Elective Courses (DSE)III : (V Sem)

Course	Course Name	L	T	P	CIA	ESE	Total	Credits
One course –From the group								
DSE – III	New Product Formulation	4	-	4	25	75	100	6
					40	60		
DSE – III	Food Production and Agriculture	4	-	4	25	75	100	6
					40	60		
Total							100	6

Discipline Specific Elective Courses IV: (VI Semester)								
Course	Course Name	L	T	P	CIA	ESE	Total	Credits
One course –From thegroup								
DSE – IV	Food Safety	4		4	25	75	100	6
					40	60		
DSE – IV	Food Toxicology	4		4	25	75	100	6
					40	60		
Total							100	6

RATHNAVEL SUBRAMANIAM COLLEGE OF ARTS AND COLLEGE (AUTONOMOUS)

UG PROGRAMMES

LIST OF EDC – 2018 -2019 BATCH

Discipline Specific Elective Courses (DSE) (V-Sem)								
EXTRA DISCIPLINARY COURSE: (EDC)								
Any one Course from the following								
EDC	Commercial Correspondence	5	1	-	25	75	100	6
EDC	Entrepreneurship	5	1	-	25	75	100	6
EDC	Project Management	5	1	-	25	75	100	6
EDC	Insurance and Risk Management	5	1	-	25	75	100	6
EDC	Social Media Marketing	5	1	-	25	75	100	6
EDC	E-Commerce	5	1	-	25	75	100	6
EDC	Indian Tax System	5	1	-	25	75	100	6
EDC	Digital marketing	5	1	-	25	75	100	6
EDC	JavaScript and JQuery	5	1	-	25	75	100	6
EDC	Web Designing	5	1	-	25	75	100	6
EDC	Cyber Security	5	1	-	25	75	100	6

EDC	Hospitality Management	5	1	-	25	75	100	6
EDC	Fundamentals of Digital Computers	5	1	-	25	75	100	6
EDC	Computational Mathematics	5	1	-	25	75	100	6
EDC	Health Management	5	1	-	25	75	100	6
EDC	Forensic Science	5	1	-	25	75	100	6
EDC	Microbes – Health & Disease	5	1	-	25	75	100	6
EDC	Health & Life Style Disorders	5	1	-	25	75	100	6
Total							100	6

Discipline Specific Elective Courses (DSE) V: (VI Semester)								
Course	Course Name	L	T	P	CIA	ESE	Total	Credits
DSE – VI	Project & Viva Voce	6	-	-	40	60	100	6
DSE – VI	Industrial exposure training report – viva voce	6	-	-	40	60	100	6
Total							100	6

Skill Enhancement Courses : Group I (III & IV Semester)								
SEC – G1	Communicative Skills - I	2	-	-	50	-	50	2
SEC – G1	Communicative Skills - II	2	-	-	50	-	50	2
Total							100	4

Skill Enhancement Courses : Group II (V Semester)

Course	Course Name	L	T	P	CIA	SEE	Total	Credits
Any one group								
Group A								
SEC – G2 – A-I	Placement - College to Corporate- I	2	-	-	50	-	50	2
SEC – G2A-II	Placement - College to Corporate - II	2	-	-	50	-	50	2
Group B								
SEC – G2 - B	Entrepreneurship Development	4	-	-	100	-	100	4
Total							100	4

Non Credit Course – Group I (III & IV Semester)

NCC-G1-I	Career Skills - I	RVS Training Academy		Grade
NCC-G 1-II	Career Skills - II	RVS Training Academy		Grade

Non Credit Course – Group II (COP)									
Semester	Course Opted	Course Name	D	L	T	P	CIA	MODEL	Marks
I	NCC–G2-I	Fruits and Vegetable Processing	3	1	1	-	25	75	100
II	NC–G2-II	Bakery and Confectionary	3	1	-	1	25	75	100
III	NC –G2 -III	Animal Food Processing	3	1	1	-	25	75	100
IV	NCC–G2 -IV	PRACTICAL I – Food Processing Lab	3	1	-	1	25	75	100
V	NCC–G2 - V	In house Training in Food Processing	3	1	1	-	25	75	100
VI	NCC–G2 -VI	Industrial Training – Report and Viva voce	3	1	-	1	25	75	100

Non Credit Course – Group III (I – IV Semester)				
Any 1 Course				
NCC – G3	National Service Scheme		NSS	Completion
	National Cadet Corps		NCC	Completion
	Sports		Physical Education	Completion
	Literacy & Cultural Club		Language Department	Completion
	Youth Red Cross /Red Ribbon Club		YRC	Completion
	Fine Arts Club		Language Department	Completion

Extra Optional Credit Course (ALCTA) I – VI Semester				
Any 1 Course with 4 extra credits				
I-VI Semester	e-Learning in MOOC Platform		4 Credits	Completion

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SCHEME OF EXAMINATIONS

B.Sc -Nutrition and Dietetics - 2018-2021 BATCH

Semester	Course Opted	Course Name	D	L	T	P	CIA	ES	Marks	Credits
I	MIL-I	Tamil-I/Hindi-I/Malayalam –I/French-I/Arabic-I	3	6	-	-	25	75	100	4
	AECC-G1 - I	English-I	3	6	-	-	25	75	100	4
	DSC – I	Food Science	3	4		4	25	75	100	6
			3				40	60		
	DSC – II	Chemistry	3	5	1		25	75	100	6
	NCC- G3	NCC/NSS/SPORTS/CULTURALS	-	1	-	-	-	-	-	-
LIB	Library	-	1	-	-	-	-	-	-	
		Total				28			400	20
II	MIL-II	Tamil-II/Hindi-II/Malayalam –II/French-I/Arabic-II	3	6	-	-	25	75	100	4
	AECC-G1 - II	English-II	3	6	-	-	25	75	100	4
	DSC – III	Human Physiology	3	5	1	-	25	75	100	6
	DSC – IV	Biochemistry	3	4	-	4	25	75	100	6
			3				40	60		
	AECC – G2 - I	Environmental Studies	3	1	-	-	100	-	100	1
	NCC-G3	NCC/NSS/SPORTS/CULTURALS	3	1	-	-	-	-	-	-
LIB	Library	3	1	-	-	-	-	-	-	
					29			500	21	

Semester	Course Opted	Course Name	D	L	T	P	CIA	ES	Marks	Credits
III	DSC – V	Principles of Nutrition	3	4		4	25	75	100	6
			3				40	60		
	DSC – VI	Family Meal Management	3	4		4	25	75	100	6
			3				40	60		
	DSE-I	Elective-I	3	4		4	25	75	100	6
			3				40	60		
	SEC – G1-I	Communicative Skills I	3	2			50		50	2
	NCC – G1-I	Career Skills – I	3	2	-	-	Grade			
NCC-G3	NCC/NSS/ SPORTS/CULTURALS	-	1	-	-	-	-	-	-	
Total					29				350	20
IV	DSC – VII	Dietetics	3	4		4	25	75	100	6
			3				40	60		
	DSC – VIII	Post Harvest Technology	3	4		4	25	75	100	6
			3				40	60		
	DSE-II	Elective-II	3	4		4	25	75	100	6
			3				40	60		
	SEC – G1-II	Communicative Skills - II	3	2			50		50	2
	NCC – G1 - II	Career Skills - II	3	2	-	-	Grade			
AECC – G2 - II	Aptitude	3	3			100	-	100	3	
NCC-G3	NCC/NSS/ SPORTS/CULTURALS	-	1	-	-	-	-	-	-	
Total					32				450	23

Semester	Course Opted	Course Name	D	L	T	P	CIA	ES	Marks	Credits	
V	DSC – IX	Food Microbiology	3	5	1	-	25	75	100	6	
	DSC – X	Community Nutrition	3	4	-	4	25	75	100	6	
			-				40	60			
	DSE-III	Elective-III	3	4	-	4	25	75	100	6	
			3				40	60			
	DSE	Elective- EDC	3	5	1	-	25	75	100	6	
	Any One Group										
	Group A										
		SEC - G1-AI	Placement - College to Corporate - I	3	2	-	-	50	-	50	2
		SEC - G1- A II	Placement - College to Corporate- II		2	-	-	50	-	50	2
	Group B										
		SEC –G 2 - B	Entrepreneurship Development	3	4	-	-	100	-	100	4
	NCC – G3	NCC/NSS/SPORTS/CULTURAL ALS	-	-	-	-	Good/Satisfactory				
Total					32			500	30		
VI	DSC – XI	Food Preservation	3	4	-	4	25	75	100	6	
			3				40	60			
	DSC – XII	Food Quality Control	3	4	-	4	25	75	100	6	
			3				40	60			
	DSE-IV	Elective-IV	3	4	-	4	25	75	100	6	
			3				40	60			
	DSE - V	Elective - V	-	6	-	-	40	60	100	6	
ALCTA *	E – learning in MOOC Platform	-	Extra Credits						4*		
Total					30			400	24		
Total									2600	136+4* = 140	

ABBREVIATIONS

MIL	Multi Indian/ International Languages
AECC-G1	Ability Enhancement Compulsory Courses – I & II: Group-I (English)
AECC-G2	Ability Enhancement Compulsory Courses – II & IV: Group-II
DSC	Discipline Specific Courses
DSE	Discipline Specific Elective Courses
EDC	Extra Disciplinary Course
NCC	Non Credit Course
SEC	Skill Enhancement Courses (Group-I &II)
ALCTA	Advanced Learners Course in Thrust Areas – e Learning in MOOC platform

DSE I -Discipline Specific Elective Courses I: (III Semester)

1. Nutrition and Fitness
2. Sports Nutrition

DSE II- Discipline Specific Elective Courses II: (IV Semester)

1. Digital Strategies in Nutrition
2. Clinical Food Service

DSE III-Discipline Specific Elective Courses III: (V Semester)

1. New Product Formulation
2. Food Production and Agriculture

DSE IV- Discipline Specific Elective Courses IV: (VI Semester)

1. Food Safety
2. Food Toxicology

DSE V- Discipline Specific Elective Courses V: (V Semester)

1. Extra Disciplinary Course (EDC)

DSE VI- Discipline Specific Elective Courses VI: (VI Semester)

1. Project Work & Viva Voce – Dietetics Case Study
2. Industrial Exposure Training Report and Viva Voce

NCC - I (Non – Credit course) Group – I

The assessment will be done by RVS Training Academy and grade will be given based on internal evaluation in the respective semester

NCC – II (Non – Credit Course) Group – II

The students shall complete the activities in the concerned semester and completion status will be mentioned in their sixth semester mark statement. However, completing the activities listed in Group – II is mandatory to complete their degrees.

NCC – III (Non – Credit Course) Group – III

The students shall complete the activities in the concerned semester and completion status will be mentioned in their fifth semester mark statement. However, completing the activities listed in Group – III is mandatory to complete their degrees.

COURSE CONTENT

Course Title : FOOD SCIENCE(T)	Course Code : 13A
Semester : I	Course Group : DSC-1
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: C (THEORY – CONCEPTS)	Total Contact Hours: 60
CIA: 25 Marks	SEE #: 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Classify foods, Summarise the cooking methods and indicate the importance of pulse cookery and nuts and oilseeds	PSO1	12	U
CO2	Summarise the composition, nutritive value and methods of cereal cookery and indicate the use of sugar in cookery	PSO1	12	U
CO3	Recognize the functions of fats and oils in cookery and discuss about the benefits of milk and milk products	PSO1	11	U
CO4	Summarise the uses of fruits and vegetables in cookery, classify the types of beverages and discuss about use of spices and condiments	PSO1	12	U
CO5	Explain the composition, nutritive value of egg and fish and indicate the role of egg and fish in cookery	PSO1	7	U
CO6	Discuss about the structure and composition of meat and poultry and identify the changes on cooking	PSO1	6	U

UNIT I: (LECTURE HOURS =12)

Introduction: Food Groups (Basic five food groups, basic four food groups | Functional food groups, Indian food pyramid). **Study of various cooking methods:** Methods of cooking-moist heat methods (Objectives, boiling, simmering, poaching, stewing, steaming and pressure cooking)- Methods of cooking - dry heat methods (Grilling, broiling, pan broiling and roasting)- Fat as a medium of cooking (Sautéing, shallow fat frying and deep fat frying). **Pulses and Grams:** Nutritive value (Energy, protein, lipids, carbohydrates, vitamins and minerals) Processing of pulses (Milling, soaking, fermentation, germination). **Nuts and Oilseeds:** Nutritive value (Energy, carbohydrates, proteins, lipids, vitamins and minerals) Role of nuts and oil seeds in cookery (Uses- thickening agent, beverage preparation, garnishing material)

UNIT II:(LECTURE HOURS =12)

Cereals: Structure (Wheat, rice - Endosperm, bran, germ)- Composition of rice, wheat and millet (Energy, protein, carbohydrate, lipid, vitamins, minerals and fiber)- Parboiling- methods (Advantages and disadvantages)- Cereal cookery (Effect of moist heat, effect of dry heat). **Flour:** Types (Whole wheat flour, self-raising flour, enriched flour, all-purpose or general -purpose flour)-Formation of dough and batter (Preparation of dough and batter)- Uses of flour in cookery (Thickening agent, coating agent, ice cream powder, pudding , custard preparation). **Sugar:** Types of sugar (Types-pure sugar, brown sugar, corn syrup, honey)- Stages of sugar cookery (Different stages and its use in cookery)- Crystallization and factors affecting crystallization (Definition, factors affecting crystallization)

UNIT III: (LECTURE HOURS = 11)

Fats and Oils: Types of fats and oils (Vegetable sources and animal sources)- Function of fats and oils in cooking (Leavening agent, texture improver, palatability, smoothness and shortening agent)- Smoking point (Definition, factors affecting smoking point of oil)- Effect of heat on oil absorption and factors affecting absorption of oil (Character and composition of food, temperature and length of time on heating)- Rancidity (Definition , types- Hydrolytic, oxidative)- Measurement of lipid oxidation (Peroxide value, iodine value-Definition). **Milk and Milk Products:** Composition and Nutritive value

of Milk (Milk fat, milk proteins(casein), milk sugar, salts, enzymes, colour, flavour and aroma and its nutritive value)- Kinds of milk (Standardized milk, toned milk, double toned milk, filled milk, homogenized milk, separated milk, recombined milk and sterilized milk)- Changes in milk during heat processing and cooking (Effects of heat- Protein, fat, sugar-protein mixtures, acid)- Preparation of fermented and non fermented milk products (Processing of fermented milk products-cheese, butter, curd processing of non fermented milk products-ice cream, khoa, milk powder)

UNIT IV: (LECTURE HOURS =12)

Vegetables:Classification, Composition and Nutritive value of vegetables (Classification, Composition and Nutritive value of vegetables)- Selection of vegetables (Based on classification, based on composition)- Methods of cooking (Dry heat methods, moist heat methods. Advantages and disadvantages). **Fruits:** Composition, Classification and Nutritive value of Fruits (Classification, Composition and Nutritive value of fruits)- Pigments(Chlorophyll, carotenoids, anthocyanins and anthoxanthins)- Changes during ripening (Definition of ripening, changes-colour, temperature, hydrolysis, acidity, taste, and humidity)- Principles, methods and effects of cooking(Dry heat methods, moist heat methods, advantages and disadvantages). **Beverages:** Classification(Refreshing, nourishing, stimulating, soothing and appetizing)- Nutritive value (Energy and carbohydrates, moisture content, protein, vitamins and minerals)- Milk based beverages (Fermented and non fermented milk based beverages)-,Fruit based beverages (Fruit juice, squash, fruit juice concentrate, fruit cordial, carbonated fruit juices).**Spices And Condiments:** Spices and condiments (Common spices used in Indian cookery, uses and abuses)

UNIT V: (LECTURE HOURS =13)

Egg:Structure and Composition of egg (Shell, shell membranes, egg whites, egg yolk and egg whites, egg shell, egg yolk, fat in the egg yolk)- Nutritive value (Energy, carbohydrates, moisture content, protein, vitamins and minerals)- Uses of egg in cookery and Methods of cooking (Poaching, frying and boiling)- Methods to evaluate the egg quality (Grading, candling, floating in water).**Fleshy Foods- Meat:** Meat-Structure (Epimysium, perimysium, endomysium)-Composition and nutritive value(Proteins of muscles, carbohydrates, fat, water, minerals and vitamins)- Post mortem changes in

meat (Rigor mortis, nutritional changes and physical changes in meat)- Tenderness (Tenderizing and methods of tenderizing (enzymes, mechanical method, exercise, chemical method))- Methods of cooking with effects(Dry heat method, moist heat method).**Poultry:**Classification (Broiler (or) fryer, rooster, stag, stewing, cock)- Nutritive value of poultry (Protein, fat, vitamins and minerals)**Fish:** Structure,types (Classification and types)-Nutritive value (Carbohydrates, protein, fat, minerals and vitamins-Selection of fish (Based on appearance (skin, eyes, gills, bones, edges, its physical characteristics))- Method of cooking and its effects (Dry heat method (broiling, baking, frying).

TEXT BOOKS

T1:Food Science and Nutrition | Edition: | Mangal Deep Publication, Jaipur | VIJAY KAUSHIK (2000)

T2:Food Chemistry | Edition: | CBS Publishers and Distributors | LILIAN HOAGLAND MEYER (2000)

T3:Food Science | Edition: | New Age International (P) limited, New Delhi | SRILAKSHMI B(2003)

T4:Food Science | Edition: | Wiley Eastern Limited , New Delhi | SUMATHI.R.MUDAMBI(1994)

T5:Food Science Chemistry and Experimental food | Edition: | New Age International (P) limited, New Delhi | SWAMINATHAN M (1997)

T6:Post harvest technology of cereals,pulses and oil seeds | Edition: | Oxford & IBH Publishing Co.Pvt.LTD,Newdelhi | ALAMELU CHAKRAVERTY(2000)

T7:Food Science | Edition:2 | CBS Publishers and Distributors, New Delhi | NORMAN. N.POTTER (2000)

T8:Food Facts and Principles | Edition:2 | New Age International (P) limited, New Delhi | SHADAKSHARASAMY AND SHAKUNTALA MANAY(2001)

T9:Food Science and Application in Indian Cookery | Edition: | Phoenix Publishing House PVT Ltd, New Delhi | USHA CHANDRASEKAR(2002)

REFERENCE BOOKS:

R1:Foods, Nutrition and Dietetics | Edition: | Sterling Publishers Pvt Ltd | RAHEENA BEGUM(2009)

Course Title : FOOD SCIENCE (P)	Course Code : 13A
Semester : I	Course Group : DSC-1
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: L (PRACTICAL EXPERIMENTS)	Total Contact Hours: 60
CIA: 40 Marks	SEE #: 60 Marks
Programme: BSC-N&# - Semester End Exam	

EXPERIMENTS

1. **Basics of Cooking** - Food groups: grouping of foods, discussion on nutritive value | Measuring Ingredients - methods of measuring foods and liquids | Edible Portion- determination of percentage of edible portion |Cooking- Moist heat and Dry Heat and fat as a media of Cooking
2. **Pulses** -Cooking of soaked and un soaked pulses and germination | Pulse cookery using dhal, legumes and sprouts
3. **Cereals-** Methods of cooking fine and coarse cereals | Cereal cookery using fine, coarse cereals and whole cereals
4. **Sugar** - Stages of sugar cookery, factors affecting crystallization | Preparation of sweets using different stages of sugar cookery
5. **Milk and Milk Products** - Common preparation with milk, cheese, paneer and curd
6. **Vegetables** - Experimental effect of acid, alkali cookery on vegetables, Prevention of browning, cooking methods
7. **Fruits** - Prevention of darkening , Vegetable and fruit cookery
8. **Preparation of recipes using egg** - Boiled eggs, Poached egg, Omelets and Custard
9. **Fleshy foods- fish, meat and poultry** - Effect of different cooking methods, Preparation of recipes using meat, poultry and fish

TEXT BOOKS

T1:Food Science | Edition: | New Age International (P) limited, New Delhi | SRILAKSHMI B(2003)

T2:Food Science | Edition:2 | CBS Publishers and Distributors, New Delhi | NORMAN. N.POTTER (2000)

REFERENCE BOOKS:

R1: Foods, Nutrition and Dietetics | Edition: | Sterling Publishers Pvt Ltd | RAHEENA BEGUM(2009)

COURSE CONTENT

Course Title : CHEMISTRY(T)	Course Code : 13B
Semester : I	Course Group : DSC -II
Teaching Scheme in Hrs (L:T:P) : 5:1:0	Credits : 6
Map Code: C (THEORY – CONCEPTS)	Total Contact Hours: 90
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Understand the basics of thermodynamic laws and principle	PSO1	18	U
CO2	Analyse the different aspects of chemical bonding	PSO1	18	An
CO3	Apply the basic rules of organic nomenclature to convert between structures and names.	PSO1	18	Ap
CO4	Perform a titrimetry experiments, and make observations and assessments of important factors that could affect the analytical result	PSO1	18	Ap
CO5	Select the relevant fertilizers for the different types of crops	PSO1	10	U
CO6	Describe physical and chemical properties of fertilizers	PSO1	8	U

UNIT - I: (LECTURE HOURS: 18)

Thermodynamics: Introduction (Definition and Importance of thermodynamics)- Types of system (Open, closed, isolated)-Types of process (Reversible and irreversible)- Laws of Thermodynamics (First Law, Internal energy, Second Law)- Enthalpy (Definition, Enthalpy of vapourisation, Enthalpy of fusion)- Bond energy (Definition, Calculation of bond energy)- Entropy (Definition, Entropy change)- Free energy (Free energy and spontaneity, Gibbs free energy).**Activity:**Chart work on different laws of Thermodynamics.

UNIT - II: (LECTURE HOURS: 18)

Chemical Bonding:Characteristics of ionic bond(Covalent character of ionic bond)- Characteristics of covalent bond (Bond length, bond angle, bond strength)- Orbital overlap (Coupling of electrons with opposite spins, Unpaired electrons overlap, Examples: Formation of H₂,F₂,O₂,N₂)- Concepts of hybridization (Introduction, Salient features of hybridization, Shapes of hybrid orbitals). **VSEPR Theory :** Introduction (Change of lone pair of electrons.Electrostatic repulsion)-Geometry of molecules (Shape of CCl₄, Shape of H₂O.Shape of NH₃). **Hydrogen Bonding:** Introduction (Hydrogen bond and its types)- Applications of hydrogen bonding (Determining structure of proteins).**Activity:** Make a model on Geometry of water and Ammonia.

UNIT – III: (LECTURE HOURS: 18)

Organic Chemistry:Introduction (Definition and Application of organic compounds in everyday life). **IUPAC Nomenclature Of Organic Molecules:** IUPAC system (Writing the structural formula). **Introduction to Stereochemistry:**Isomerism (Isomers - Types of isomerism, Optical activity, Optical isomers of lactic acid, malic acid).**Cyclic and Acyclic Compounds:**Introduction (Organic compounds – classification – scheme)- Cyclic compounds(Types,Structures of cyclohexane, benzene,phenol)-Acyclic compounds (Structure of Methane, butane. Properties). **Organic Reactions:** Addition & Elimination (Definition, Ethylene with bromine, propylene and HI, Propylbromide and alcoholic KOH)-Substitution (Definition. Methane replaced with chlorine). **Activity:** Chart work on structure of Cyclic and Non-cyclic compounds, -,

UNIT – IV: (LECTURE HOURS: 18)

Volumetric Titrimetry: Introduction (Methods of quantitative analysis. Analyte, titrant)- Standard solutions (Primary and secondary standards.Titrations with solutions of some other substances)- Concentration terms (Normality, molality, molarity. Preparation of (1) 100 ml of 0.1 M Mohr salt.(2) 50ml of 0.001M KMnO₄).**Principles of Acid Base Titration:** Introduction (Acids, alkali solutions.Eg: sulphuric acid Vs sodium hydroxide. Use of indicators) - Titrations (Strong acid Vs strong base. weak

acid Vs strong base. Weak base Vs strong acid)- EDTA titrations (Introduction, indicators for EDTA titrations. Determination of hardness of water). **Activity** -Preparation of 1N NaOH and 1 M NaOH

UNIT – V: (LECTURE HOURS: 18)

Silicons: Synthesis(Silicon tetrachloride, hydrolysis, silica)- Properties and uses (Water repellents, good insulators. Electric motors and withstand high temperatures). **Fertilizers:**Introduction(Essential nutrients for plants, functions)- Nitrogenous fertilizers (Ammonium sulphate, calcium ammonium nitrate, urea)- Potash and Mixed fertilizers (Potassium nitrate. NPK fertilizers). **Activity:** Powerpoint on various types of Fertilizers.

Text Books :

T1-Principles of Physical Chemistry | Edition:36 | ShobanlalNagin Chand & Co | PURISHARMA(1995)

T2-Principles of Inorganic chemistry | Edition:25 | Shobinlalnagin Chand & Co | PURISHARMA(2000)

T3-Text book of Organic Chemistry | Edition:28 | Sultan chand& sons | H.M.CHAWLA. AND P.L.SONI.(2005)

Reference Books :

R1-Chemistry | Edition:4 | Houghton mifflin company new york | STEVEB S ZUMDHAL (1997)

COURSE CONTENT

Course Title : HUMAN PHYSIOLOGY(T)	Course Code : 23A
Semester : II	Course Group : DSC- III
Teaching Scheme in Hrs (L:T:P) : 5:1:0	Credits : 6
Map Code: D (THEORY – APPLICATION)	Total Contact Hours: 90
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D# - Semester End Exam	

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Classify the different types of tissues, describe the features of blood components and outline the types of immunity.	PS02	20	U
CO2	Summarise the anatomy and functions of cardio pulmonary systems	PS02	17	U
CO3	Identify the structure and working of digestive system and excretory system	PS02	18	U
CO4	Describe the features of various endocrine glands and reproductive system	PS02	17	U
CO5	Discuss about structure and functions of central nervous system	PS02	9	U
CO6	Summarise the structure and functions of sense organs	PS02	9	U

UNIT I: (LECTURE HOURS = 20)

Cell And Tissues: Structure and Functions(Cell organelles-Cell membrane, cytoplasm, mitochondria, ribosome and nucleus)- Tissues (Structure and functions of various kinds of tissues - Epithelial tissue, connective tissue, muscular tissue and nervous tissue). **Blood:** Blood-(Composition and Functions)- RBC, WBC and platelet(Morphology and functions) -Blood volume (Physiological variation, measurement, factors regulating blood volume)- Blood coagulation(Blood clotting factors, clotting time, prothrombin time)- Blood groups and Rh factor (Determination, importance in blood grouping)- Blood transfusion (Conditions, precautions, blood substitutes)- Haematocrit value and Erythrocyte Sedimentation Rate (Determination, normal values, variations)- Plasma Proteins and Lymph (Functions).**Immunity:** Definition and types of immunity(Definition, Types-Innate immunity, acquired immunity, Antigen) -Antibody interaction (Interaction between antigen and antibody).**Activity:** Report the Blood Group of your classmates

UNIT II: (LECTURE HOURS =17)

Circulatory System: Heart(Structure and functions - Size, form, location, heart chambers)- Blood vessels (Arteries and veins)- Cardiac output (Definition, factors maintaining cardiac output)-Heart Rate (Normal heart rate, factors affecting heart rate) - Cardiac muscle and their properties(Excitability, rhythmicity, conductivity and contractility)- Cardiac cycle (Definition, cardiac cycle time, interrelations of the various events in the cardiac cycle)- Blood Pressure and Hypertension (Definition, physiological variation and measurement). **Respiratory System:** Basic anatomy and functions of respiratory system (Nose, pharynx, larynx, trachea,bronchi,lungs ,pleuric cavities and gas exchange,regulation,voice production, olfaction and innate immunity)-Transport and exchange of gases (Oxygen transport, carbon-di-oxide transport)-Mechanism of breathing (Diaphragm,intercoastal muscles and motion of the ribs)- Anoxia and dyspnoea (Definition, classification). **Activity:** Find out the heart rate of your classmates after an exercise

UNIT III: (LECTURE HOURS = 18)

Digestive System: Structure of GI tract (Mouth, ,salivary glands, ,stomach, ,pancreas, ,liver and gall bladder, ,small intestine, large intestine)- Digestion, absorption and assimilation of food – (Carbohydrates, protein and lipid metabolism)-Secretion of digestive juices (Saliva, bile, gastric secretion and pancreatic juice secretion)- Movement of digestive system (Deglutition, movements of stomach, ,small intestine, ,large intestine).**Excretory System:**Kidney (Nephron, juxtaglomerular apparatus, bowman’s capsule)-Functions of kidney (Excretion, regulation)- Formation of urine (Glomerular filtration,tubular secretion). **Activity:** Prepare a model of the digestive system.

UNIT IV: (LECTURE HOURS = 17)

Endocrine Glands: Pituitary gland (Structure and functions)- Thyroid gland (Structure and functions)- Parathyroid gland (Structure and functions)- Adrenal gland(Structure and functions)-Islets of Langerhans (Structure and functions). **Reproductive System:** Anatomy of the male reproductive organs(Testis, seminal vesicles, prostate gland, urethra and penis)- Anatomy of the female reproductive organs (Primary sex organs, secondary sex organs, ovary)- Structure of sperm (Nature, composition and structure)- Menstrual cycle (Menstrual phase, proliferative phase, secretory phase,)-Maturation of graffian follicle (Tunica albuginea,zonapellucida,thecainterna)- Ovulation and conception (Follicle development, ,maturation of the oocyte, follicle and conception). **Activity:** Collect information on the diagnosis of disorders of endocrine glands

UNIT V: (LECTURE HOURS =18)

Central Nervous System:Anatomy and physiology of nervous tissue (Somatic nervous system, autonomic nervous system)- Neuron and Neuroglia (Classification, structure)- Reflex action – (Classification, properties)-Reflex arc (Receptor, afferent nerve, efferent nerve and effector organ)- Synapse (Definition, classification and properties)-Cerebrum (Structure and functions)- Cerebellum (Structure and functions)- Medulla oblongata (Structure and functions)- Hypo thalamus (Structure and functions).**Sense Organs:** Eye (Structure and functions)- Ear (Structure and functions)- Nose (Structure and functions)- Tongue (Structure and functions)- Skin (Structure and functions).**Activity:** Taste sensitivity

Text Books :

T1. HUMAN PHYSIOLOGY | Edition: | Medical allied Agency, calcutta | CHATTERJEE(2000)

T2. TEXT BOOK OF HUMAN PHYSIOLOGY | Edition:5 | S.chand and company (Ltd),New Delhi | SARADHA SUBRAMANYAM (2000)

T3. GENERAL IMMUNOLOGY | Edition:2 | J.B.Lippincott company, Philadelphia | HERMANNEISEN(1986)

T4. ESSENTIALS OF MEDICALS PHYSIOLOGY | Edition:4 | Jaybee brothers medical publishers (P) Ltd.,New De | SEMBULINGAM K(2006)

T5. FUNDAMENTALS OF HUMAN ANATOMY AND PHYSIOLOGY | Edition: | Tata mc.graw hill education (Pvt) Ltd.,New Delhi | CINNAMONVAN PUTTE(2011)

T6. ANATOMY AND PHYSIOLOGY IN HEALTH AND ILLNESS | Edition: | Churchillivingstone, sydney | ANNEWAUGE(2001)

Reference Books:

R1. MEDICAL PHYSIOLOGY | Edition: | CBS publication and distributors, New Delhi | MARIA R K(1986)

COURSE CONTENT

Course Title BIOCHEMISTRY(T)	Course Code : 23B
Semester : II	Course Group : DSC- IV
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: D (THEORY – CONCEPTS)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSc-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	CLses	BLOOM'S TAXONOMY LEVEL
CO1	Understand the features including structure ,function of carbohydrates	PSO1	13	U
CO2	Understand the various types of lipids	PSO1	11	U
CO3	Recognize the structure and function of aminoacids.	PSO1	12	U
CO4	Derive the structure and nature of the protein molecules	PSO1	13	U
CO5	Explain the metabolism and its disorders	PSO1	11	U

UNIT I:**(LECTURE HOURS: 13)**

Carbohydrates:Introduction (Definition, Glucose, Glycogen, Functions of Carbohydrates)- Classification (Monosaccharide, Disaccharides, Polysaccharides)- Classification of Monosaccharide (Diose,Triose,Tetrose,Pentose, Hexose)- Occurrence and Structure of Monosaccharides (Glucose,

Fructose)-Occurrence and Structure of Disaccharides (Lactose, Sucrose)- Occurrence and Structure of Polysaccharides (Starch,Glycogen)

UNIT II: (LECTURE HOURS: 11)

Lipids: Structure (Glycerol ,Phospholipids, Glycolipids)- Classification (Fats, waxes, derived lipids)- Properties (Good solvent, melting point, Specific gravity)- Saturated fatty acids (Acetic acid, branched chain fatty acids)- Unsaturated fatty acids (Monounsaturated, polyunsaturated,eicosanoids)- Essential fatty acids (Hydrogenation,clotting time)-Cholesterol (Structure,Properties and functions).

UNIT III: (LECTURE HOURS: 12)

Amino Acids: Introduction (Monomers of proteins, isoelectric Ph)-Classification (Aliphatic side chain,sulfur atoms, basic groups) - Reactions (Oxidizing agent, Decarboxylation) -Proteins Introduction Classification (Simple, conjugated, derived proteins)- Denaturation and Renaturation of Proteins- Structural levels of protein Primary (Native conformation, Insulin)- Secondary, Tertiary (Keratin, collagen, fibrous protein)- Quaternary –(Hemoglobin)

UNIT IV: (LECTURE HOURS: 13)

Nucleic Acids: Introduction (DNA, RNA)- Structure & Composition (DNA, RNA)- Forms of DNA (Major groove, minor groove, negative supercoils)- Functions of DNA (Chemical energy, enzyme cofactors)- RNA Types (Messenger RNA, Transfer RNA, Ribosomal RNA, Small stable RNA)- Denaturation, Renaturation (Anneal, A=T bases).

UNIT V: (LECTURE HOURS: 11)

Carbohydrate Metabolism:Glycolysis (Phases, Pyruvate)- TCA cycle (Reactions of citric acid cycle, Energetics) –Disorder(Diabetes mellitus)- Protein metabolism Introduction (Urea cycle) -Pathways (Deamination, Transamination, decarboxylation, pathways of amino acid metabolism)- Fat metabolism Introduction (Calorific value, oxidation, glycerol)- Beta oxidation (Fatty acid oxidation)- Disorder (Disorder of fat metabolism).

Text Books :

T1- Fundamentals of Biochemistry | Edition:6 | New Central Book Agency, Calcutta | A.C.Deb(1993)

T2-Principles of Biochemistry | Edition:2 | CBS Publishers | Lehninger(1993)

T3- Harper's Biochemistry | Edition:23 | Large Medical Publishers | Murray(1993)

Reference Books :

R1-Cell biology organelle structure and functions | Edition:1 | Jones and Bartlett |
David.E.Sadava(1993)

Course Title BIOCHEMISTRY (P)	Course Code : 23B
Semester : II	Course Group : DSC- IV
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: D (PRACTICAL-APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSc-N&D	# - Semester End Exam

QUALITATIVE ANALYSIS OF CARBOHYDRATES

Qualitative Analysis of Monosaccharides: - Glucose, Fructose

Qualitative Analysis of Disaccharides - Sucrose, Maltose

Qualitative Analysis of Polysaccharides - Starch, Dextrin

LIPID ANALYSIS

Determination of Acid number of edible oil

Determination of saponification number of edible oil

Estimation of unsaturated fat by iodine value of oil

Demonstration Experiments - Soxhlet extraction of lipids from ground nuts/egg yolk

QUALITATIVE ANALYSIS OF AMINO ACIDS

Qualitative Analysis of Non-polar, Aliphatic Aminoacids - Methionine, Leucine

Qualitative Analysis of Aromatic Aminoacids - Tyrosine, Tryptophan

Qualitative Analysis of Polar, Uncharged Aminoacid – Serine

Qualitative Analysis of Charged Aminoacid - Histidine

NUCLEIC ACIDS PRACTICAL

Alkali hydrolysis on RNA, Determination of molecular weight of DNA

QUALITATIVE ANALYSIS OF PROTEIN

Identification of protein by Biuret method,

Denaturation of protein using Egg, Disorder – Phenylketonuria,

Qualitative analysis of Urea in urine using Benedict's reagent.

Text Books :

T1- Fundamentals of Biochemistry | Edition:6 | New Central Book Agency, Calcutta | A.C.Deb(1993)

T2-Principles of Biochemistry | Edition:2 | CBS Publishers | Lehninger(1993)

T3- Harper's Biochemistry | Edition:23 | Large Medical Publishers | Murray(1993)

Reference Books :

R1-Cell biology organelle structure and functions | Edition:1 | Jones and Bartlett | David.E.Sadava(1993)

COURSE CONTENT

Course Title : PRINCIPLES OF NUTRITION(T)	Course Code : 33A
Semester : III	Course Group : DSC-V
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: C (THEORY – CONCEPTS)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Describe the concepts of energy and summarize the function and distribution of water in body	PS01	11	U
CO2	Explain the functions, metabolism and effects of deficiency of Carbohydrates and fiber in relation to health	PS01	10	U
CO3	Express the role of protein in human health	PS01	9	U
CO4	Explain the Functions, metabolism and effects of Deficiency of Lipids	PS01	6	U
CO5	Describe a comprehension of water-soluble and fat-soluble vitamins by describing their individual and collective functions, requirements, sources, deficiency	PS01	10	U
CO6	Describe a comprehension of the essential minerals by describing their functions, requirements, sources and deficiency	PS01	14	U

UNIT I: (LECTURE HOURS = 11)

Introduction: Concept of Nutrition (Definition of nutrition, Nutrients and classification of nutrients)-

Energy:Energy value of foods (Introduction, units and determination of energy value of foods.Physiological fuel value)- Components of Energy Requirement of body (BMR, physical activity and thermogenesis - definition, determination and factors influencing BMR).

Water Balance:Distribution of water(ICF and ECF- IF, TCF)- Functions and sources (Part of structure, turgor, solvent, reactant, lubricant, temperature regulator. Sources of water)- Regulation of water balance in body (Maintenance of fluid in body tissues, over hydration, dehydration and water intoxication).

UNIT II: (LECTURE HOURS =10)

Carbohydrates: Functions, Sources (Source of energy, protein sparing action, oxidation of fats, indispensable for nervous system, role in muscle, role in liver. Rich, good and fair sources) - Digestion, absorption and metabolism (Mechanism).**Dietary Fibre:**Types, Sources (Soluble and insoluble fibre, Rich and poor sources)- Functions(Water holding capacity, decreased transit time, excretions of bile salt, excretion of cholesterol, delayed gastric emptying and decreased requirement to insulin)- Importance in health (GI disorders, cancer, heart disease, diabetes and obesity).

UNIT III: (LECTURE HOURS = 15)

Protein: Functions ,Sources, requirement (Growth and maintenance, formation of essential body compound, transport of nutrients, regulation of water balance, maintenance of appropriate PH, defense and detoxification and source of energy. Rich, good and fair sources, ICMR's RDA)- Digestion, absorption and metabolism(Mechanism)- Evaluation of Protein Quality (PER, DC , BV and Chemical Score)- Essential Amino Acids (Definition, Types, Sources). **Lipids:** Functions, Sources, Requirement (Fat in body and fat in diet .Rich, good and fair sources. ICMR's RDA)- Digestion, absorption and metabolism (Mechanism)- Importance of EFA and its deficiency (Definition, Types, functions, sources and deficiency)

UNIT IV: (LECTURE HOURS = 10)

Vitamins: Classification Fat Soluble Vitamins -vitamin A (Functions, sources, requirement, deficiency)- Vitamin D (Functions, sources, requirement, deficiency)- Vitamin E (Functions, sources, requirement, deficiency)- Vitamin K (Functions, sources, requirement, deficiency). **Water Soluble**

Vitamins: Vitamin B1 (Functions, sources, requirements and effects of deficiency)-Vitamin B2 (Functions, sources, requirements and effects of deficiency)- Vitamin B3 (Functions, sources, requirements and effects of deficiency)- Vitamin B6 (Functions, sources, requirements and effects of deficiency)- Vitamin B12 (Functions, sources, requirements and effects of deficiency)- Vitamin C (Functions, sources, requirements and effects of deficiency).

UNIT V: (LECTURE HOURS =14)

Minerals: Classification (Macro and Micro minerals)- Calcium (Functions, sources, requirement and deficiency)- Phosphorus (Functions, sources, requirement and deficiency)- Sodium, Potassium (Functions, sources, requirement and deficiency)- Iron (Functions, sources, requirement and deficiency)- Iodine, Fluorine (Functions, sources, requirement and deficiency)- Zinc, Copper (Functions, sources, requirement and deficiency).

Text Books :

T1. Nutritional Science | Edition:III | New Age International Publishers Ltd., New Delhi | Srilakshmi B(2000)

Reference Books :

R1.Food and Nutrition | Edition:II | BappcoPublishers | SwaminathanM.S(1993)

R2.Human Nutrition | Edition:II | Mosny publishers | GuthrieA.H AND Picciano(1995)

R3.Essentials of Medical Physiology | Edition:IV | Jaypee Brothers Medical Publishers (P) Ltd | Sembulingam(2006)

Course Title : PRINCIPLES OF NUTRITION(P)	Course Code : 33A
Semester : III	Course Group : DSC- V
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: L (PRACTICAL EXPERIMENTS)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSC-N&D # - Semester End Exam	

EXPERIMENTS

1. Demonstration of working of bomb calorimeter
2. Estimation of total carbohydrates by anthrone method
3. Determination of fibre in vegetables
4. Determination of fibre in fruits
5. Demonstration of working of Microkjeldahl apparatus
6. Estimation of aminoacid by Sorensen's Formaldehyde titration method
7. Estimation of fat by Soxhlet
8. Estimation of Ascorbic acid in vegetables
9. Estimation of Ascorbic acid in fruits
10. Estimation of calcium in milk
11. Estimation of phosphorus

Text Books :

T1.Nutritional Science | Edition:III | New Age International Publishers Ltd., New Delhi | Srilakshmi B(2000)

Reference Books :

R1.Food and Nutrition | Edition:II | BappcoPublishers | SwaminathanM.S(1993)

R2.Human Nutrition | Edition:II | Mosny publishers | GuthrieA.H AND Picciano(1995)

R3.Essentials of Medical Physiology | Edition:IV | Jaypee Brothers Medical Publishers (P) Ltd | Sembulingam(2006)

COURSE CONTENT

Course Title : FAMILY MEAL MANAGEMENT(T)	Course Code : 33B
Semester : III	Course Group : DSC- VI
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: D (THEORY – APPLICATION)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Apply the basics of meal planning and to prepare balanced diets for adulthood	PS02	10	A
CO2	Relate the physiological changes, weight gain and nutritional needs during pregnancy to plan balanced diets	PS02	10	A
CO3	Practice menu planning for lactation using the nutritional requirements	PS02	6	A
CO4	Interpret the importance of human milk, artificial feeding and use of supplementary foods to plan balanced diets for infants	PS02	12	A
CO5	Schedule menus for children to suit their nutrient requirements	PS02	11	A
CO6	Use the knowledge on nutritional needs for adolescence and old age to plan balanced diets	PS02	11	A

UNIT I:(LECTURE HOURS = 10)

Menu Planning:Introduction(Definition of Health, Balanced Diet-, Recommended dietary allowance (Recommended dietary allowance of different age groups (ICMR, 2010))-), Principles of menu planning (Meeting nutritional requirements, age, sex, physical activity, physiological conditions, family fulfillment, economic consideration, nutrients, individuals likes and dislikes variety, availability of food, health value of food)-Steps involved in menu planning (Recommended dietary allowance (ICMR, 2010), food list, making menu)- Low cost balanced diets (Importance, Dietary guideline lines to reduce the cost of a meal). **Nutritional Needs During Adulthood:**Basic nutrient needs (Physiologic differences (Males, females), reference man, reference woman) - Nutritional requirements (Energy, protein, fat, minerals, vitamins).

UNIT II: (LECTURE HOURS =16)

Nutritional Needs During Pregnancy: Stages of gestation (First trimester, Second trimester, Third trimester)- Physiological changes during pregnancy (Blood volume and composition, cardiovascular system, respiration, renal function, gastrointestinal function, hormones)- Weight gain in pregnancy (Optimal weight gain, excessive weight gain)- Physiological cost of pregnancy (Fetal growth, maternal tissues)- Nutritional requirements (Energy, protein, fat, vitamin, minerals)- General dietary problems (Nausea and vomiting, heart burn, beliefs, avoidances, cravings and aversions)-Complications during pregnancy (Anemia, constipation, edema, Pregnancy Induced Hypertension, diabetes mellitus).**Nutritional Needs During Lactation:** Role of hormones in lactation (Hormonal control of lactation)-Factors influencing lactation (Maternal nutritional status, supplementary feeding, infant demand, physical activity, fluid intake, lactogogues)- Nutritional requirements(Energy, protein, fat, vitamin, minerals)

UNIT III: (LECTURE HOURS = 12)

Nutrition During Infancy: Growth and development (Physical growth, growth chart, changes in body composition)- Nutritional requirements (Energy, protein, fat, minerals, vitamins)- Composition of Human milk (Colostrum and its importance, Energy, carbohydrate, lipids, protein, minerals, vitamins)-

Breast feeding and its advantages (Feeding technique, advantages to the infant and to the mother)- Artificial feeding (Necessity, advantages and disadvantages of bottle feeding, modification of the formula, comparison of cow's milk and human milk, technique of feeding). **Weaning Foods:**Weaning foods (Meaning, needs and use, points to be considered in weaning)- Weaning food developed by various organizations (Indian multipurpose food, malt food, balahar, supplementary food, kuzhanthaiamudhu, win food, amutham, poshak, kerala indigenous food)- Supplementary Foods (Liquid supplements, solid supplements, mashed foods, solid supplements unmashed, processed foods)- Problems in weaning (Obesity, underweight, food allergy, refusal to take new food, choking).

UNIT IV: (LECTURE HOURS = 11)

Nutritional Needs of Pre-School Children (1-6 Years): Physiological growth (Growth rate, body composition, growth chart)- Nutritional requirements (Energy, protein, fat, minerals, vitamins)- Food requirements (Food requirements, dietary guidelines)- Nutrition related problems (Protein energy malnutrition, vitamin A deficiency).**Nutritional Needs Of School Going Children:**Physiological growth (Growth rate, body composition)- Nutritional requirements (Calories, proteins, minerals, vitamins, fiber)- Food requirements (Importance of breakfast, dietary guidelines)- Nutrition related problems (Underweight, constipation, dental carries obesity)- Packed lunch (Introduction, Points to be considered in planning packed lunch).

UNIT V: (LECTURE HOURS =11)

Nutritional Needs During Adolescence: Physiological growth (Puberty, initiation of puberty, stages of growth and development)- Nutritional requirements (Energy, protein, fat and essential fatty acids, minerals, vitamins)- Nutritional problems (Obesity, eating disorders, anemia, under nutrition, premenstrual syndrome, malnutrition due to early marriage and consequent early pregnancy).**Nutritional Needs During Old Age:**Process of ageing (Physical, psychological and immunological changes)-Degenerative changes during old age (Changes in organ function with ageing that may influence nutrient requirements)- Nutritional requirements (Energy, protein, carbohydrate, lipids, minerals, vitamins, water, fiber)- Dietary guidelines (Consistency of food, dietary guidelines)- Nutrition

and health related problems (Osteoporosis, obesity, neurological dysfunction, anemia, malnutrition, constipation, cardiovascular diseases and diabetes mellitus).

TEXT BOOKS:

T1.Dietetics | Edition:6 | New Age International (P) Limited, New Delhi | SRILAKSHMI B (2011)

T2.Nutrition Throughout Life Cycle | Edition:3 | WCB McGraw-Hill Companies, Inc | Bonnie S. Worthington AND Sue Rod Williams (1998)

REFERENCE BOOKS :

R1.Nutrition Science | Edition: | New Age International (P) Ltd | SRILAKSHMI B(2010)

Course Title : FAMILY MEAL MANAGEMENT(P)	Course Code : 33B
Semester : III	Course Group : DSC- VI
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M (PRACTICAL APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSC-N&D	# - Semester End Exam

EXPERIMENTS

1. Planning and preparation of balanced diet for different income levels of adults
2. Planning and preparation of balanced diet for different income levels of pregnant women
3. Planning and preparation of balanced diet for different income levels of lactating mothers
4. Planning and preparation of balanced diet for infancy
5. Planning and preparation of balanced diet for different income levels of pre - school children
6. Planning and preparation of balanced diet for different income levels of school going children
7. Planning and preparation of balanced diet for different income levels of adolescents
8. Planning and preparation of balanced diet for different income levels of old age person

TEXT BOOKS:

T1.Dietetics | Edition:6 | New Age International (P) Limited, New Delhi | SRILAKSHMI B (2011)

T2.Nutrition Throughout Life Cycle | Edition:3 | WCB McGraw-Hill Companies, Inc | Bonnie S. Worthington AND Sue Rod Williams (1998)

REFERENCE BOOKS :

R1.Nutrition Science | Edition: | New Age International (P) Ltd | SRILAKSHMI B(2010)

COURSE CONTENT

Course Title : ELECTIVE-I NUTRITION AND FITNESS(T)	Course Code : 33E
Semester : III	Course Group : DSE - I
Teaching Scheme in Hrs. (L:T:P) : 4:0:0	Credits : 4
Map Code: D(THEORY – APPLICATION)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Summarize the various components of fitness and preparation for fitness programs	PS02	13	U
CO2	Identify the assessment of body composition and estimate the calorie requirement for various activities	PS02	12	U
CO3	Predict the role of Nutrition in energy balance	PS02	13	U
CO4	Recognize the special nutritional requirements for sports persons	PS02	10	U
CO5	Explain the different types of exercise equipments	PS02	6	U
CO6	Discuss the safety measures during exercise and prevention of injuries	PS02	6	U

UNIT I: (LECTURE HOURS: 13)

Basics Of Fitness: Fitness (Definition of fitness and health. Benefits of fitness - misconceptions about fitness)- Categories of fitness (Health related fitness and motor related fitness)- Components of Health Related Fitness (Muscular strength, endurance, flexibility, cardio - respiratory endurance and body composition)-Components of Motor Related Fitness (Speed, strength, endurance, agility, power, co-ordination and reaction time)- Factors influencing fitness (Age, sex, climate, diet, exercise and training)- Types of exercises (Aerobic, anaerobic)- Fitness and its Measurement (Flexibility, co-ordination, equilibrium, speed, agility, strength and endurance)- Preparing for fitness programme (General guidelines of fitness programme - Factors to considered before beginning physical activity, during physical activity).

UNIT II: (LECTURE HOURS: 12)

Assessment Of Body Composition: Body composition (Definition, components)- Measurement of Body Composition (Direct methods and indirect methods)- Direct methods (Dissection, chemical analysis)- Indirect methods (BMI, underwater / hydrostatic weighing, total body water, dual energy x-ray absorptiometry (DEXA), bioelectrical impedance)- Body weight Components (Body fat, adipocytes, hypertrophy and hyperplasia)- Measuring total energy requirement (Energy balance method, heart rate monitoring method, doubly labeled water technique, factorial method)- Energy expenditure for different types of exercises (Aerobics, anaerobic)- Factors affecting Fuel utilization (Feeding, fasting and starvation).

UNIT III: (LECTURE HOURS: 13)

Weight Management: Training (Introduction)- Principles of training (Overload, specificity, reversibility and variance)- Training for circulo respiratory endurance(Continuous exercise and interval training. nutrition during training, diet programming)- Sources of energy in the body and their role in weight management (Carbohydrates, fats and proteins. Importance of water)- Methods of Weight Reduction (Principles of weight management and fat control- Diet and fat control.Combination of physical activity and diet control)- Methods of Weight Gain (Principles to improve muscle

development. Techniques involved in increasing body weight)-Weight control Fads (Beliefs and fallacies, body wraps, diet pills and Aids and diet control)-Popular commercial diet programmes (Very low calorie diet, diet programmes, internet based diets).

UNIT IV: (LECTURE HOURS: 10)

Nutrition In Sports:Energy System (Anaerobic energy system and aerobic energy system) - Nutritional requirements of Athletes (Carbohydrate, protein, fat, vitamins, minerals, fluid and electrolytes)- Nutritional allowances for different groups of athletes (General grouping of sports events for suggesting allowances)- Sports Supplements (Macro nutrient supplements, anti- catabolics, ergogenics and fat burners)- Broad guidelines for sports persons (Frequent meals, High Glycemic index, Carbohydrate loading, Bulky food, Stimulant beverages, Nutrition during contest)- Competition meals (Pre competition, during competition and post competition meal)-Nutrition and physical performance (Sport nutrition principles).

UNIT V:(LECTURE HOURS: 12)

Fitness Center Operations: Infrastructure Facilities for Fitness Center (Lay out)- Gymnasium (Introduction)- Evolution of Gym Culture (Health, obesity, ageing population fitness with, gym, learning correct techniques and specialization)- Principles of starting a fitness center (Location, policy, offer programmes, budgeting, marketing, record keeping, public relations, individualized grooming programmes and reports) - Different types of exercise equipments (Manual equipments and electronic equipments). **Safety Measures:** Types of injuries (Classification-muscle strain, tendinitis and bursitis)- Steps to avoid injuries (Warm up and cool down, good technique)- Common exercise mistakes (Unbalanced strength training programs, poor technique, inconsistent progression, lack of cross training, incorrect machine set-up, skipping the warm up, poor gym etiquette and poor goal setting)- Prevention and Management of injuries (Rest, Ice Pack, Compression and Elevation).

Text Books :

T1.Nutrition and dietetics | Edition:3 | Tata McGraw Hill Education private limited |
ShubhanginiJoshi(2010)

T2.Normal and Therapeutic Nutrition | Edition:17 | W.S.Saunders's Company | Ann Garwin AND Corrine H Robinson AND Marilyn R Lawles AND Wanda Chenweth(1989)

T3.Dietetics | Edition:6 | New Age International Publishers | Srilakshmi B(2011)

Reference Books :

R2.Physical Fitness and Health | Edition: | KhelSahitya Kendra | Rachna Jain(2006)

R2.Fitness,Aerobics and Gym Operations | Edition: | KhelSahitya Kendra | Amita Rana AND Seema Kaushik AND Sheela Kumari.S(2009)

R3.Fitness A Lifetime Commitment | Edition:2 | Surjeet | David K.Miller AND T.Earl Allen(1989)

Course Title : ELECTIVE-I NUTRITION AND FITNESS(P)	Course Code : 33E
Semester : III	Course Group : DSE - I
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M (PRATICAL APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSC-N&D	# - Semester End Exam

EXPERIMENTS:

1. Assessment of fitness - Flexibility, co-ordination, equilibrium, speed, agility, strength and endurance
2. Measuring height, weight, Calculation of BMI (Body Mass Index) - Calculation of daily calorie requirement
3. Prepare High protein, low calorie, high calorie, very low calorie recipes
4. Planning of meal - Pre game meal, post-game meal, during meal
5. Visit to a Gym - Introduction of Equipments and its working procedure. Preparation a Report

Text Books :

T1:Nutrition and dietetics | Edition:3 | Tata McGraw Hill Education private limited | ShubhanginiJoshi(2010)

T2.Normal and Therapeutic Nutrition | Edition:17 | W.S.Saunder's Company | Ann Garwin AND Corrine H Robinson AND Marilyn R Lawles AND WandaIChenweth(1989)

T3.Dietetics | Edition:6 | New Age International Publishers | SrilakshmiB(2011)

Reference Books :

R1.Physical Fitness and Health | Edition: | KheI Sahitya Kendra | RachnaJain(2006)

R2.Fitness,Aerobics and Gym Operations | Edition: | KhelSahitya Kendra | AmitaRana AND SeemaKaushik and SheelaKumari.S(2009)

R3.Fitness A Lifetime Commitment | Edition:2 | Surjeet | David K.Miller AND T.Earl Allen(1989)

COURSE CONTENT

Course Title : ELECTIVE I - SPORTS NUTRITION(T)	Course Code : 33E
Semester : III	Course Group : DSE- I
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: C (THEORY – CONCEPTS)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Describe the definition, significance and classification of sports events	PSO1	6	U
CO2	Explain the types and characteristics of strength or high intensity sports and give the nutritional requirements for sports athletes.	PSO1	7	U
CO3	Describe the sports specific nutrition and hydration guidelines in power/strength, weight class-combat and racket sport athletes.	PSO1	11	U
CO4	Explain the physiology, energy system and body composition, macro and micronutrient requirements in training and competition	PSO1	11	U
CO5	Classify the dietary supplements and explain the	PSO1	13	U

	macronutrient supplements used in sports.			
CO6	Describe the Benefits and Applications of micronutrient supplements.	PSO1	12	U

UNIT I:(Lecture Hrs: 13)

Sports Nutrition: Introduction (Definition and significance, classification of sports events)- Strength or high intensity sports (Types and characteristics of strength or high intensity sports (sprinting, throwing, body building etc) Physiology of energy systems).**Nutrition For Strength Sport Athletes:**Nutritional requirements(macronutrients- carbohydrates, fats and proteins, impact of resistance training on body composition of athletes in strength sports).

UNIT II: (Lecture Hrs: 11)

Nutrition For Weight Class Sports: Combat sports and individual events (Types and characteristics physiological needs, body composition and energy systems used) – Macro and micronutrient requirements in training and competition (Hydration guidelines in weight class sports, weight loss and gain in training and competition)- Strategies to promote healthy weight loss in athletes

UNIT III: (Lecture Hrs:11)

Nutrition For Racket Sport Athletes- Badminton, Squash, Tennis:Characteristics (physiology, energy system and body composition, duration of match, training, macro and micronutrient requirements in training and competition, dietary and hydration strategies for athletes in different periods of training and competition).

UNIT IV: (Lecture Hrs: 13)

Dietary Supplements: Dietary Supplements Regulations and Classification, Macronutrient- (Supplements, Pure protein, protein bars, Weight gainers; Amino acid supplements, Glutamine,

Arginine) –Carbohydrate supplements & EFAs, Glycerol (Meal replacement powders, Ready To Drink protein shakes (RTDs) – Sports drinks).

UNIT V:**(Lecture Hrs: 12)**

Dietary Supplements: Micronutrient Supplements (Benefits/Mechanism of action and Applications) – Vitamins (Ergogenic role of B-complex vitamins, Vitamin B12 & folic acid, Vitamin D supplements)- Multi-vitamin supplements (Mineral supplements: Calcium-Magnesium, Iron supplements, supplements)- Electrolyte replacement drinks (Antioxidant vitamins & mineral supplements).

TEXT BOOKS

T1. Manore, M., Meyer, N. L., & Thompson, J. (2009). Sport nutrition for health and performance. Human Kinetics.

T2 Burkee, L. and Deakin, V. (2006) Clinical sports nutrition (3rdEd.) The McGraw Hill Companies

REFERENCE BOOKS

R1. Mahan, L.K. and Escott-Stumps, S. (2000) Krause's food, nutrition & diet therapy (11thEd.) CRC press

Course Title : ELECTIVE I - SPORTS NUTRITION(P)	Course Code : 33E
Semester : III	Course Group : DSE-I
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: C (PRACTICAL – CONCEPTS)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSC-N&D	# - Semester End Exam

PRACTICAL EXPERIMENTS:

1. Planning and preparation of diets for high intensity sports
2. Planning and preparation of diets for Boxing, Weightlifting
3. Planning and preparation of diets for Badminton -Squash -Tennis/Table-tennis
4. Planning and preparation of macro nutrient supplements and sports drinks
5. Planning and preparation of antioxidant and micronutrient supplements for sports person

TEXT BOOKS

T1. Manore, M., Meyer, N. L., & Thompson, J. (2009). Sport nutrition for health and performance. Human Kinetics.

T2 Burkee, L. and Deakin, V. (2006) Clinical sports nutrition (3rdEd.) The McGraw Hill Companies

REFERENCE BOOKS

R1. Mahan, L.K. and Escott-Stumps, S. (2000) Krause's food, nutrition & diet therapy (11thEd.) CRC press

COURSE CONTENT

Course Title :DIETETICS(T)	Course Code : 43A
Semester : III	Course Group : DSC- VII
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits) : 4
Map Code: D (THEORY – APPLICATION)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Discuss the role of dietitian,interpret the concepts of diet therapy in modifying the normal diet according to the therapeutic conditions and during energy imbalance.	PS02	15	U
CO2	Discuss about infection, febrile conditions, GI tract, respiratory, liver and Gall bladder diseases and interpret the dietary management according to the disease conditions.	PS02	11	U
CO3	Sketch about the pathogenesis of the disease conditions and modify the dietary management in various cardio vascular diseases.	PS02	9	A
CO4	Recall the definition, classification, symptoms, causes, diagnosis and risk factors of diabetes mellitus and modify the dietary management	PS02	9	A

	according to the disease condition.			
CO5	Illustrate the types of kidney disease and relate the symptoms, causes and risk factors of the disease with the diagnosis and discuss about the treatment and modify the dietary management.	PS02	7	A
CO6	Discuss the dietary management of food allergens, inborn error diseases, cancer, burns, neurological disease and AIDS	PS02	9	A

UNIT I:**(LECTURE HOURS = 15)**

Introduction To Dietetics And Diet Therapy: Dietetics (History of dietetics, definition of dietetics and diet therapy, scope of dietetics, objectives, principles and purpose of diet therapy). **Concepts Of Diet Therapy:** Dietitians (Definition, classification, code of ethics, duties and responsibilities)-, Dietitian in India (History, current status, Indian Dietetic Association). **Therapeutic Diets:** Modification of diets (Routine hospital diets, Clear fluid, full fluid, soft diet, bland and light diet, regular normal diet, high protein, low protein, high fibre, low fibre and Pre and post operative diets) **Special Feeding Methods:** Enteral nutrition (Introduction, tube feeding-routes ,scientific formula feeding techniques)- Parenteral nutrition (Introduction to parenteral feeding /PPN/TPN - Nutritional requirements, osmolarity). **Diet During Energy Imbalance:** Obesity (Definition, etiology, assessment, grades of obesity, prevention treatment dietary management, life style modification, white brown adipose tissue, weight reduction, maintenance, surgery)- Underweight (Definition, etiology, clinical manifestations, diet modification).

UNIT II:(LECTURE HOURS =11)

Diet In Infection And Fever: Typhoid, influenza, tuberculosis, malaria (Definition, causes, types - acute ,chronic ,intermittent ,signs and symptoms, principles of diet, modification of nutrients). **Diet In Disease Of Gi Tract:** GERD, Peptic and gastric ulcer (Etiology, clinical features, diagnosis, treatment, dietary management)- Constipation (Definition, etiology, types and treatment)- Diarrhoea (Definition,

causes, types, symptoms, treatment, fluid management, ORS)- Irritable bowel syndrome and inflammatory bowel disease (Causes, symptoms and dietary management).**Diet In Respiratory Diseases** : Bronchitis, Chronic obstructive pulmonary diseases and respiratory failure (Introduction, types, etiology, symptoms and dietary management).**Diet In Diseases Of The Liver And Gall Bladder:** Hepatitis, jaundice (Introduction, etiology, symptoms and dietary management)- Cirrhosis, Hepatic coma (Introduction, etiology, symptoms principles of diet and dietary management)-Cholecystitis and cholelithiasis (Introduction, etiology, symptoms principles of diet and dietary management).

UNIT III: (LECTURE HOURS = 9)

Diet In Cardio Vascular Diseases : Cardio vascular diseases (Definition, types of cardiac diseases, risk factors)- Atherosclerosis (Definition, role of fat in atherosclerosis and dietary management , Risk of Trans fat in the diet)- Hypertension (Pathogenesis, causes, types, symptoms, principles of diet and dietary management)- Congestive heart failure (Pathogenesis, clinical manifestation and management)- Myocardial infarction (Causes, symptoms and dietary management)- Regimen (Fitness therapy for cardiovascular patient - yoga ,meditation)- Importance of functional foods in prevention of CVD (Antioxidant rich food, fibre, omega 3, omega 6 foods).

UNIT IV:(LECTURE HOURS = 16)

Diet In Diabetes Mellitus :Introduction to diabetes (Definition, classification -MODY,LADA (in adults) , etiology, sign and symptoms)-Complications, Dietary management(Acute and chronic complications)- Diagnosis tests (FBS, random blood sugar, glucose tolerance test, impaired glucose tolerance, glycosylated haemoglobin)- Treatment, medical treatment, Dietary modification and life style (Clinical criteria, biochemical criteria,, blood glucose monitoring, management of diabetes, physical activity, oral hypoglycaemic drug, education, Food exchange for diabetic patients, glycemic index of foods, nutritional requirements).**Diet In Disease Of Kidneys:** Glomerulonephritis (Introduction, causes, symptoms, principles of dietary management, dietary Management)- Nephrotic syndrome (Nephrosis) -(Symptoms, principles of diet and dietary treatment)- Renal failure-Acute and Chronic (Introduction, causes, symptoms, dietary

management)- Dialysis (Principles and types)- Urolithiasis or Urinary calculi (Etiology, types, diet modifications).

UNIT V: (LECTURE HOURS =9)

Food Allergy:Food Allergy (Common food allergies, Treatment of allergy). **Diet In Inborn Errors Of Metabolic Disease:** Lactose intolerance (Causes, dietary management, diagnosis, treatment)- Phenylketonuria (Definition, incidence, biochemical defects, prognosis, symptoms, diagnosis, clinical changes, dietary Management). **Diet In Cancer:**Cancer (Types, risk factors, symptoms, general systemic reactions and nutritional requirements).**Critical Conditions:** Burns /trauma (Degree of burns, Nutritional care). Neurological diseases(Epilepsy, seizures).**Diet In Aids :** Acquired immunodeficiency syndrome (Manifestations, nutritional requirements, oral supplementation).

TEXT BOOKS:

T1.CLINICAL NUTRITION AND DIETETICS | Edition: | Oxford University, Mumbai | AntiaP(1989)

T2. NORMAL AND THERAPEUTIC NUTRITION | Edition:XVII | W.S.Saunder's Company | Ann Garwin AND Corrine H.Robinson and Marilyn R. Lawles AND Wanda I Chenweth(1989)

T3.FOOD NUTRITION AND DIET THERAPY | Edition: | W.S.Saunder's Company Philadelphia, London | Krause AND M.V. Hunesher(1980)

T4. DIETETICS | Edition: VII | New Age international Private Ltd, New Delhi | SrilakshmiB(2011)

REFERENCE

R1.HUMAN NUTRITION AND DIETETICS | Edition:IX | F & S, Lingstons Ltd., Edinburgh and London | B S ranch J.F AND Davidson S.S. Passmore(1980)

R2.NUTRITION AND DIETETICS: Third edition: Tata McGraw Hill Education PVT LTD

shubhanginiA.Joshi

Course Title : DIETETICS (P)	Course Code : 43A
Semester : III	Course Group : DSC- VII
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M (PRACTICAL APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSC-N&D	# - Semester End Exam

1. **Types of Hospital Diets** - Planning of normal diet , soft diet, full liquid diet, bland diet, clear liquid diet
2. **Enteral Feeding** - Preparation of enteral feeding mixes
3. **Diet for Nutritional Imbalances** - Diet for obesity, underweight
4. **Diet in Febrile Conditions** - Typhoid, Long duration- Tuberculosis
5. **Diet for Diseases of GI Tract** - Peptic ulcer, diarrhea, constipation
6. **Diet in Liver Diseases** - Cirrhosis, hepatitis
7. **Diet for Cardio Vascular Diseases** - Atherosclerosis, hypertension, myocardial infarction
8. **Diet for Diabetes Mellitus** - Juvenile diabetes, adult diabetic patient, gestational diabetes
9. **Diet for Disease of the Kidney** - Nephritis, renal calculi, diet during acute and chronic renal failure
10. **Diet in Cancer and AIDS** - Preparation of diet for cancer and AIDS
11. **Dietary Department Visit** - Observation of the functioning of a dietary department

TEXT BOOKS:

T1. NORMAL AND THERAPEUTIC NUTRITION | Edition: XVII | W.S.Saunders's Company | Ann

Garwin AND Corrine H. Robinson and Marilyn R. Lawles AND Wanda I Chenweth(1989)

T2. FOOD NUTRITION AND DIET THERAPY | Edition: | W.S.Saunders's Company Philadelphia,

London | Krause AND M.V. Hunesher(1980)

T3. DIETETICS | Edition: VII | New Age international Private Ltd, New Delhi | SrilakshmiB(2011)

COURSE CONTENT

Course Title : POST HARVEST TECHNOLOGY(T)	Course Code : 43B
Semester : IV	Course Group : DSC -VIII
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: D (THEORY – APPLICATION)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Outline the food production trends and explain the losses in Post harvest period. Discuss the significance of food based revolutions	PSO1	12	U
CO2	Identify the causes of post harvest food losses and discuss the prevention measures	PSO1	10	U
CO3	Explain the different methods of processing cereals and pulses	PSO1	13	U
CO4	Summarise the processing of Nuts and oilseed processing methods and Describe the cultivation and processing of single cell proteins and preparation of textured vegetable proteins	PSO1	9	U
CO5	Review the production, preliminary processing and storage of fruits , vegetables and sea food processing	PSO1	6	U

CO6	Classify the storage structures and recognise the role of organizations and agencies in controlling food losses	PSO1	10	U
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UNIT I:**(LECTURE HOURS: 12)**

Introduction To Post Harvest Technology: Food production (Global and national food production trends)- Stages of post-harvest technology (Harvesting, field drying, threshing, cleaning, additional drying, processing and storage)- Losses at different stages (Loss in the field, threshing yard, storage and marketing)-Food and nutritional security (Concept, need and importance at global and national level).**Food Based Revolutions:** Green revolution (Introduction, history, outcomes and significance in Indian context)- White revolution (Introduction, history, outcomes and significance in Indian context)- Blue revolution (Introduction, history, outcomes and significance in Indian context)- Yellow revolution (Introduction, history, outcomes and significance in Indian context)- Golden revolution (Introduction, history, outcomes and significance in Indian context).

UNIT II:**(LECTURE HOURS: 10)**

Agents Causing Food Losses: Introduction (Types and significance)- Physical agents (Moisture, temperature)- Chemical agents (Enzymatic and oxidation reactions)- Physiological agents (Respiration, sprouting, heating)- Biological agents (Rats, Rodents and grain storage pests).**Control Of Spoilage Agents:** Physical methods (Heating, radiation)- Chemical methods (Fumigation, sprays)- Biological methods (Microbial control method, Insects and rodent control).

UNIT III: (LECTURE HOURS: 13)

Cereal Processing:Processing of Rice (Milling of rice)- Parboiling (Methods, advantages and disadvantages)- Byproducts of milling of rice (Starch, bran)- Products of Rice processing (Parched rice, puffed rice , flaked rice)- Processing of Wheat (Milling and conditioning)-Byproducts of milling of wheat (Whole wheat flour, maida, semolina and macroni products)- **Pulse Processing** : Traditional milling (Wet milling and dry milling)- Modern milling (CFTRI method)- Commercial milling (Red gram, black gram, green gram).

UNIT IV: (LECTURE HOURS: 15)

NutsAndOilseedsProcessing: Groundnut processing (Oil extraction)- Gingelly seed processing (Oil extraction)- Sun flower oil processing (Solvent extraction, mechanical expression)- Palm oil processing (Extraction)- Coconut oil processing (Traditional method and mechanical extraction from fresh coconut meal)- Rice bran oil processing (Solvent extraction method and batch extraction method)-Cold pressed oils (Introduction, history, processing, advantages).**Novel Proteins:** Mushroom (Cultivation, harvesting, drying, storage and utilization)-Algae ,spirulina, sea weeds, SCP (Cultivation, harvesting, drying, storage and utilization)-Textured Vegetable Proteins (Soy protein isolate and ground nut protein isolate).**Fruits And Vegetables And Seafoods:** Fruits and vegetables (Production, storage, preliminary processing and storage)- Sea foods (Production, storage, preliminary processing and storage).

UNIT V: , , (LECTURE HOURS: 10)

Storage Of Grains: Indigenous grain storage structures (Indoor, outdoor and underground storage structures)- Modern storage structures (Ware house and silos)-Traditional storage structures (Bulk,bag, godowns). **Agencies And Organisations Controlling Food Losses:** National Agencies- SGC (Introduction, objectives, functions)- FCI (Introduction, objectives, functions)- CWC (Introduction, objectives, functions)- SWC (Introduction, objectives, functions)-IGSI (Introduction, objectives, functions).**Inter-National Agencies:**FAO (Introduction, objectives, functions)-CFTRI (Introduction, objectives, functions)- ICAR (Introduction, objectives, functions).

Text Books :

T1. Post-harvest technology of cereals, pulses and oil seeds | Edition: | Oxford and IBH Publishing Co Pvt Ltd, New Delhi | Alamelu Chakraverty(2000)

T2. Food Science | Edition:4 | New Age International (p)Ltd, New Delhi | Srilakshmi B(2010)

T3. HANDBOOK ON MUSHROOMS | Edition:4 | Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi | NITA BAHAL(2000)

T4..Nutrition and Dietetics | Edition:3 | Tata McGraw Hill Education Pvt Ltd, New Delhi | SubhanginiJoshi(2010)

T5. Handling and storage of food grains in tropical and sub-tropical areas | Edition: | South asia books publishers | D.W.Hall (1980)

T6..Pursuit and promotion of science: the Indian experience | Edition: | | New Delhi: Indian National Science Academy (2001)

T7.Oilseeds Processing Technology | Edition: | Central Institute of Agricultural Engineering | PrabhatK.Srivasta AND Ram K. Kupta AND Shukla(1992)

T8.Food processing and preservation | Edition:1 | Prentice-Hall of India Pvt.Ltd | SIVASANKAR(2004)

Reference Books:

R1.Food , Nutrition and Agriculture | Edition: | Kanishka Publishers, New Delhi | SreeLathaMenon(1999)

R2.website : ICAR, FAO, CFTRI

Course Title : POST HARVEST TECHNOLOGY(P)	Course Code : 43B
Semester : IV	Course Group : DSC- VIII
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M (PRACTICAL APPLICATION)	Total Contact Hours: 48
CIA: 40 Marks	SEE # : 60 Marks
Programme: B.Sc-N&D	# - Semester End Exam

EXPERIMENTS

- Determination of moisture and size of grains
- Determination of acid content of fruits
- Determination of sugar content of fruits
- Determination of spoilage during storage of food products - Refrigeration, room temperature, freezer (sensory aspects)
- Identifying the changes in foods stored in different packaging material- airtight container, polythene covers
- Prepare value added products from byproducts of rice milling.
- Prepare value added products from byproducts of wheat milling.
- Prepare value added products from byproducts of oil milling.
- Cultivation of mushroom
- Visit to a food storage unit

Text Books :

T1. Post-harvest technology of cereals, pulses and oil seeds | Edition: | Oxford and IBH Publishing Co Pvt Ltd, New Delhi | AlameluChakraverty(2000)

T2. Food Science | Edition:4 | New Age International (p)Ltd, New Delhi | SrilakshmiB(2010)

T3. HANDBOOK ON MUSHROOMS | Edition:4 | Oxford and IBH Publishing Co.Pvt. Ltd, New Delhi | NITA BAHAL(2000)

T4.Nutrition and Dietetics | Edition:3 | Tata McGraw Hill Education Pvt Ltd, New Delhi | SubhanginiJoshi(2010)

Reference Books:

R1.Food , Nutrition and Agriculture | Edition: | Kanishka Publishers, New Delhi | SreeLathaMenon(1999)

R2.website : ICAR, FAO, CFTRI

COURSE CONTENT

Course Title : ELECTIVE II - DIGITAL STRATEGIES IN NUTRITION(T)	Course Code : 43E
Semester : IV	Course Group : DSE-II
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: D (THEORY – APPLICATION)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Apply MS word to create and print a document with tables and graphs. Perform basic calculations and create charts and graphs	PSO1	12	A
CO2	Prepare a presentation in MS power point, Design a database using MS Access. Define proper formats for sending and receiving e mail. To get familiarise with basics of the internet	PSO4	11	A
CO3	Relate the impact of information and communication technologies in nutrition and health.	PSO4	8	A
CO4	Identify and familiarise with features of nutrient analysis software and its limitations.	PSO3	7	U
CO5	Prepare and effectively utilise database to organise , store and retrieve data for use in health care soft wares.	PSO3	11	A
CO6	Apply computer soft wares in nutrition calculation and dietary assessment	PSO4	11	A

UNIT I:(LECTURE HOURS = 12)

MS Office:MS-Word (Parts of word window, creating, opening, saving, deleting and renaming a word document, editing and formatting the text and paragraphs, previewing and printing a document, creating and formatting table and working with graphics, Mail merge)- MS- Excel (Starting excel, parts of excel window, creating, opening, saving, deleting and renaming, printing worksheets working spreadsheets, working with formulas, creating and editing graphs and charts).

UNIT II:(LECTURE HOURS =11)

MS office:MS Power Point (Creating, opening, saving, deleting and renaming, printing slides, slide show presentation, slide transition, adding sound and animation effects)- MS Access (Starting Access, working with database, queries, tables, forms, reports).**Internet and EMail:** Internet (Introduction, web browsers, web servers, search engines, online and offline web browsing)- Email (Individual account creation, creating a mail-ID, sending and receiving mails, sending attachments).

UNIT III: (LECTURE HOURS = 15)

Nutrition Informatics And Health Information Technology: Areas of practice(Community Nutrition, Clinical Nutrition, Consultation and Business Practice)- Values of HIT (Computerized provider order entry, Clinical decision support systems, Web-Based Delivery of Nutrition Interventions)- Consumer Health Informatics Tools (Personal Health Records, Smart Phone Applications, Social Networking/Condition-Specific Sites)- Nutrition Informatics Skills Specific to Levels of Dietetics Practice (Competent, Proficient, Expert).**Computerized Nutrient Analysis Systems:** Features of nutrient analysis software (Food description, food portion and weights, nutrient and food components, user interface, output options)- General information (Data input, data output, data analysis, data communication)- Clinical care (Communication in patient care, Nutritional Therapy)- Clinical nutrition (Assessment tools, nutrient drug interaction, patient education, computer assisted instruction for health professionals, text-on-screen examples, multimedia examples, application to distance learning)- Limitations of nutrient analysis software (Data entry errors, misinterpretation of results).

UNIT IV: (LECTURE HOURS = 11)

Health Care Software:Health care software applications (Acquiring and storing data,. Summarizing and displaying data, Facilitating communication and information exchange, Generating alerts, reminders, and other forms of decision support, Supporting educational, research, and public health initiatives)- Software development life cycle (Planning/Analysis, design, development, integration and test, implementation, verification, validation, operation and maintenance and evaluation).

UNIT V: (LECTURE HOURS =11)

Softwares In Management Of Nutrition Practice:Nutritics (Analyse clients diets and create effective meal plans for real results, recipe costing and nutrition calculator software, nutrition label maker including allergen information and nutrition claims)- DietSoft (Software for Dietary Calculations. Based on Indian Data (NIN, ICMR, IFCT 2017))- Nutricalc(Nutrition calculation software)- Dietcal (A tool for dietary assessment and planning)- Mealplus (A tool for nutrient analysis).

TEXT BOOKS :

T1. Handbook of nutrition and food | Edition:3 | CRC Press. Boca Raton| Carolyn D.B, Johanna. T.D and David. H (2014)|pp: 115-120.

T2.Food technology | Hardlines Ltd, Oxford| Belinda.C, Barbara.C and Catherine. T (2002) |pp: 57-61, 78-85, 88-110.

T3.The Entrepreneurial Nutritionist | Edition:3 | Helm Publishing, Texas | Kathy King (1991) |pp: 221-224.

T4.Handbook of Nutrition and diet | Eastern Hemisphere Distribution, USA | Babasaheb B. Desai (2000) |pp: 453-456.

T5.Nutrition informatics, Practice Paper of the Academy of Nutrition and Dietetics, Academy of Nutrition and Dietetics.

T6. Biomedical Informatics-Computer application in health care and biomedicines 4th edition.

REFERENCE

R1. Fundamentals of computers | Edition:| Tata McGraw Hill Publishing Company Ltd, New Delhi | Balagurusamy E(2009).

Course Title : ELECTIVE II - DIGITAL STRATEGIES IN NUTRITION (P)	Course Code : 43E
Semester : IV	Course Group : DSE-II
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M (PRACTICAL APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSC-N&D	# - Semester End Exam

EXPERIMENTS

- MS Word** - a. Creating, entering text and saving a document b. Editing adocument -Add new text, find and replace, selecting text, delete, cut, copy, paste, move text c. Working with margins, pages,line spaces, header and footer d. Email a document and mail merge e. Adding graphics to a document Printing a document |
- MS Excel** - a. Creating, saving, opening, closing workbook b. Entering data in worksheet c. Editing work sheets d. Working with ranges e. Excel formulas f. Creating charts
- MS Power point** - a. Creating presentation b. Working with slides c. Transition and builds to presentation
- MS Access** - a. Creating database, save, close, open b. Table and relationship between tables c. Form - Create, modify, sort, filter data d. Query - Create and run e. Report -

Create, customize, working with control

5. Collection of web based information and dissemination of nutrition knowledge

- a. Anaemia b. Diabetes Mellitus c. Nutrition for different age groups

6. Use MS Office in nutrition data compilation

7. Demonstration of working on online nutrition software

TEXT BOOKS :

T1.Handbook of nutrition and food | Edition:3 | CRC Press. Boca Raton| Carolyn D.B, Johanna. T.D and David. H (2014)|pp: 115-120.

T2.Handbook of Nutrition and diet | Eastern Hemisphere Distribution, USA | Babasaheb B. Desai (2000) |pp: 453-456.

T3.Nutrition informatics, Practice Paper of the Academy of Nutrition and Dietetics, Academy of Nutrition and Dietetics.

T4.Biomedical Informatics-Computer application in health care and biomedicines 4th edition.

COURSE CONTENT

Course Title : ELECTIVE II - CLINICAL FOOD SERVICE(T)	Course Code : 43E
Semester : IV	Course Group : DSE -II
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: C (THEORY – CONCEPTS)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Identify the basics in food service	PSO1	13	U
CO2	Recognize the physical requirements in kitchen and storage area	PSO1	12	U
CO3	Infer skills in purchasing and meal planning	PSO1	6	U

CO4	Explain production, service and cleaning in a clinical settings	PSO1	7	U
CO5	Indicate the management of resources in hospitals	PSO1	11	U
CO6	Describe the principles of management and accounting.	PSO1	11	U

UNIT I: (Lecture Hrs: 13)

Types Of Service In Hospitals: Food service (Definition and its types, equipment used for serving the food in hospitals and hygienic role of persons delivering food).

UNIT II: (Lecture Hrs: 12)

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

UNIT III: (Lecture Hrs: 13)

Quantity food Production: Food Purchasing (Purchasing activity, buying food, Receiving & storage of food)- Food Production (Food production system, Menu planning for patients and food production process, effective use of left over)-Cleaning (Meaning of cleaning, dishwashing, types of cleaning & sanitizing agents, bleaches and disinfectants).

UNIT IV: (Lecture Hrs: 11)

Management: Management (Definition, principles and techniques of effective management, leadership and managerial abilities in a hospital dietary unit, organization Chart, communication)- Management of Resources (Money, Space, Materials, Equipments, Staff, Time, Energy)-Cost control (Principles and

methods of food cost control, labour, operating and overhead cost. Sample costing of a dish, methods and factors affecting pricing).

UNIT V: (Lecture Hrs: 11)

Accounts Maintenance: Accounting (Definition and principles, journal and ledger)- Book of account (Cash book, purchase book, sales book, purchase returns & sales returns book).

TEXT BOOKS

T1. Sethi M and Mahan S.-Catering Management an integrated approach , 2006, 2nd edition, John wiley& Sons, New York.

T2.Tersel MC and Harger – Profession food preparation , John wiley&Sons,New York.

T3. Joan C Boason , Lennox M.-Hotel, hostel & hospital housekeeping , 2004, 5th edition, Book power publishers, New York.

T4.Mcswane D, Linton R – Essentials of food safety & sanitation, 1998, Prentice hall international, London.

REFERENCE BOOKS

R1. Kotas R and Davis B “food cost control” Billing & Sons Ltd, Great Britian ,1976

Course Title : ELECTIVE II - CLINICAL FOOD SERVICE (P)	Course Code : 43E
Semester : IV	Course Group : DSE-II
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M (PRACTICAL APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSC-N&D	# - Semester End Exam

PRACTICAL EXPERIMENTS:

1. Observation of different equipments used in hospital food service.
- 2.Planning and designing a kitchen layout
- 3.Organizing, preparing and serving of one special meal for 50 members.
- 4.Calculation of food cost.
- 5.Observation of records maintained in a dietary department.

TEXT BOOKS

- T1. Sethi M and Mahan S.-Catering Management an integrated approach , 2006, 2nd edition, John wiley& Sons, New York.
- T2.Tersel MC and Harger – Profession food preparation , John wiley&Sons,New York.
- T3. Joan C Boason , Lennox M.-Hotel, hostel & hospital housekeeping , 2004, 5th edition, Book power publishers, New York.
- T4.Mcswane D, Linton R – Essentials of food safety & sanitation, 1998, Prentice hall international, London.

REFERENCE BOOKS

- R1. Kotas R and Davis B “food cost control” Billing & Sons Ltd, Great Britian ,1976

COURSE CONTENT

Course Title FOOD MICROBIOLOGY(T)	Course Code : 53A
Semester : V	Course Group : DSC - IX
Teaching Scheme in Hrs (L:T:P) : 5:1:0	Credits : 6
Map Code: D (THEORY – CONCEPTS)	Total Contact Hours: 90
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSc-N&D Exam	# - Semester End

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Describe the history of microbiology and classify the microorganisms	PSO1	19	U
CO2	Indicate the principles of food spoilage, and explain the importance of water microbiology and destruction of microorganisms	PSO4	17	U
CO3	Identify the spoilage and predict the contamination in plant origin foods	PSO4	18	U
CO4	Describe the spoilage and contamination in animal origin foods	PSO3	10	U
CO5	Review food borne diseases	PSO3	9	U
CO6	Express the role of beneficial microorganisms in food preparation and in health	PSO4	17	U

UNIT I: (LECTURE HOURS: 19)

History of Microbiology: Introduction (Definition of microbiology, History of eminent, microbiologist, Parts and uses of microscope)- Theories (Theory of spontaneous generation, theory of diseases, fermentation theory, immunization). **Micro Organisms Important In Food Microbiology:** Bacteria (Morphology, reproduction)- Classification of bacteria (Based on nutrition, temperature, oxygen requirements)- Growth curve of bacteria (Lag phase, log phase, stationary phase and phase of decline)- Significance of bacteria in foods (Genera of bacteria important in foods)- Molds (Classification and identification of molds, Molds of industrial importance)- Yeast (General characteristics, Yeast of industrial importance)- Algae (Morphology, reproduction, physiology and nutrition, genera of algae important in foods). **Activity:** Report on beneficial effects of microbes in food

UNIT II:(LECTURE HOURS: 17)

Micro Organisms And Food Spoilage: General principles underlying spoilage (Causes of spoilage, factors affecting kinds, and number of micro organisms in food. Classification of foods by ease of spoilage, Factors affecting the growth of microorganisms)- Intrinsic factors (Moisture, pH, nutrients, Enzymes)- Extrinsic factors (Temperature, humidity, oxygen). **Water Microbiology:** Determination of water quality (Bacteriological examination, total count, test for E.Coli)- Purification of water (Physical process - Filtration, sedimentation and distillation)-Biological process (Slow sand filters or biologically active carbon)- Chemical process (Flocculation and chlorination, electromagnetic radiation, ultra violet light). **Destruction Of Micro Organisms:** Physical agent (Heat- dry, moist, desiccation)- Chemical agents (Phenols, alcohols, surface active agents, halogens)- Other agents (UV radiation, ionizing radiation). **Activity:** Specifications of water activity in foods to prevent spoilage.

UNIT III: (LECTURE HOURS: 18)

Spoilage Of Plant Origin Foods: Cereals and cereal products (Sources of contamination)- Cereal grains and flours (Spoilage)-Baked products (Spoilage in bread, cake and other baked products)- Fruits and vegetables (Source of contamination)- Spoilage of fruits and vegetables (General types of

spoilage)-Fruits and vegetables products (Different types of spoilage).**Spoilage Of Miscellaneous Foods:**Fats and oils (Contamination and spoilage)- Bottled beverages and spices (Contamination and spoilage)- Spoilage of canned foods (Causes of spoilage, Appearance of unopened can, Types of Spoilage).**Activity:**Prepare a check list to detect spoilage of common food items

UNIT IV:(LECTURE HOURS: 19)

Spoilage Of Animal Foods: Egg (Contamination and spoilage)- Milk and milk products (Contamination and spoilage)- Meat (Contamination and types of spoilage)-Meat products (Spoilage of cured meat, sausages, bacon and ham)-Poultry (Contamination and spoilage)- Fish (Contamination and spoilage).**Food Borne Diseases:** Classification (Food poisoning and food infection, botulism, staphylococcal intoxication, salmonellosis, clostridium perfringens illness).**Activity:**Prevalence of food borne illnesses

UNIT V:, (LECTURE HOURS: 17)

Beneficial Micro Organisms In Food Preparation: Rice based products (Idly, dosa, and appam preparation)- Wheat based products (Baked products - Bread, Bun)-Fruit products (Production of wine and beer, distilled liquors)- Fermented milk (Curd , butter milk)- Cheese (Types, preparation of cheddar cheese)-Soya based products (Tempeh and miso).**Role Of Microorganisms In Health:**Prebiotic foods (Types, significance of prebiotic foods)- Probiotic foods –(Probiotic organisms, significance in maintaining health).**Activity:**Identify the common fermented food products available in the market

Text Books:

- T1. FOOD MICROBIOLOGY | Edition: | McGraw Hill Book | FRAZIERWC(1998)
T2. MODERN FOOD MICROBIOLOGY | Edition:5 | International Publishing | JAMES M. JAY ANDRAHEENABEGUMM(1996)

Reference Books :

- R1. MICROBIOLOGY | Edition: | Tata McGraw - Hill | CHAN E. C.S AND MICHAEL J AND NOELRKRUEF AND PELZAR (1993)
R2. FOOD MICROBIOLOGY | Edition: | | ADAMS()

COURSE CONTENT

Course Title : COMMUNITY NUTRITION (T)	Course Code : 53B
Semester : V	Course Group : DSC -X
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: D (THEORY –APPLICATION)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Employ the concepts and strategies for improving nutrition and health status of the community and the etiology of malnutrition	PS02	10	A
CO2	Apply the various methods of nutritional assessment and Relate to the nutritional problems of the community	PS02	11	A
CO3	Interpret the Measures to overcome malnutrition	PS02	7	A
CO4	Discover the role of various organizations in combating malnutrition	PS02	9	A
CO5	Illustrate the epidemiology of various communicable and non communicable diseases in the community	PS02	13	A
CO6	Sketch the health and nutrition communication and use different methods to impart to the	PS02	10	A

	community			
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UNIT I: (LECTURE HOURS = 10)

Introduction To Community Nutrition: Concepts of family and community health (Definition, types and significance of community nutrition, community nutritionist -Role and responsibilities).**Nutrition In The Community:** Good nutrition, Malnutrition, Optimum nutrition (Virtual cycle of nutrition, Vicious cycle of malnutrition, underweight and overweight).**Etiology Of Malnutrition:** Factors affecting the health and nutrition of the community (Socio economic status, education, environment, genetics, health services and gender| Interrelationship between malnutrition, infection and poverty).**Strategies For Improving Nutrition And Health Status of The Community:** Prophylaxis, supplementation, nutrition communication, kitchen gardening, immunization (An Overview).

UNIT II:(LECTURE HOURS =11)

Assessment Of Nutritional Status: Direct And Indirect Assessment:Anthropometry (Height, weight, skin- fold, arm circumference, head circumference, chest circumference, waist hip ratio, body fat percentage)- Classification of nutritional status (WHO classification – stunting, underweight and wasting, Gomez- classification, water low - classification, IAP – classification)- Clinical and biochemical signs (Nutritional assessment, ICMR proforma, bio chemical tests for assessing the nutrition, Diet survey - Definition, food balance sheet, inventory method, weighment method, expenditure pattern method, food frequency, diet history, 24hr recall (3days) method and recording method).**Nutritional Problems In India:** Protein energy malnutrition (Definition, types, causes, prevalence and symptoms of marasmus, kwashiorkor)- Iron deficiency Nutritional Anemia (Introduction, prevalence, causes, prevention, prophylactic programme)- Vitamin A deficiency (Introduction, prevalence, causes, prevention, prophylactic programme)- Iodine deficiency (Introduction, prevalence, causes, prevention, prophylactic programme)..

UNIT III: (LECTURE HOURS = 16)

Measures To Overcome Malnutrition:Public distribution system (PDS) (History, role in ensuring food security)- Supplementary Feeding Programmes (ICDS, SNP, Mid-day Meal Programme - functions and objectives)- Income generating programmes (IRD, RLEGP (NREP), TRYSEM, Food for work Programme).**Role Of Organizations In Combating Malnutrition:** International organizations (WHO, FAO, CARE, UNICEF, World Bank - objectives and functions)- National Organizations (ICMR, NNMB, NIN, ICAR, CFTRI - Functions and objectives).

UNIT IV: (LECTURE HOURS = 13)

Epidemiology Of Communicable Diseases: Malaria (Causes, mode of transmission, treatment, prophylactic factors)- Chicken pox (Causes, mode of transmission, treatment, prophylaxis factors)- AIDS (Causes, mode of transmission, treatment)-Dengue (Causes, mode of transmission, treatment).**Epidemiology Of Non - Communicable Diseases:** Obesity, Diabetes (causes and preventive measures)-Cardio vascular disorder (causes and preventive measures)- Cancer (causes, treatment).**Health Care Delivery System:** ESI (Scope, administration, benefits of employees) - PHC, MHC, Government Hospital, CHC (Introduction, functions, administrations).

UNIT V: (LECTURE HOURS =10)

Health and Nutrition Communication: Introduction (Meaning, objectives and significance)- Communication (Concept, functions, essential of good communication)- Communication media (Oral, written, pictures, actions).**Preparation Of Communication Materials:** Preparation methods and implementation, advantages and disadvantages (Audio-aids - Radio, puppet and drama)- Visual aids (Charts, posters, flash cards, flannel graph, flip charts, pamphlets and models)- Modern materials for communication (audio- visual aids - Television, video, websites, social networking, facebook, whats app, MHealth, films).

TEXT BOOKS :

T1.TEXT BOOK OF PREVENTIVE AND SOCIAL MEDICINE | Edition: | Jaypee Brothers Medical Publishers (P) Ltd, Delhi | MAHAJAN(1995)

T2.TEXT BOOK OF PREVENTIVE AND SOCIAL MEDICINE | Edition: | Jahaipu Publication | PARKAND PARK(1995)

T3.NUTRITION SCIENCE | Edition: | New Age International Publishers (P)Ltd, New Delhi | SRILAKSHMIB(2011)

T4.FOOD AND NUTRITION | Edition: | Bappco Ltd, Bangalore | SWAMINATHANM(2004)

T5.UGC HOME SCIENCE | Edition: | Kalyani publishers | YADLAJASRAI(1990)

REFERENCE BOOKS :

R1.ASSESSMENT OF NUTRITIONAL STUDIES OF THE COMMUNITY | Edition: | WHO GENEVA | JELLIFFEED D(1989)

Course Title : COMMUNITY NUTRITION (P)	Course Code : 53B
Semester : V	Course Group : DSC -X
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: I (PROJECT)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSC-N&D	# - Semester End Exam

EXPERIMENTS

1. ASSESSMENT OF THE NUTRITIONAL STATUS OF THE COMMUNITY

Group Project - Socio economic status, medical profile, nutritional assessment (anthropometric, clinical, biophysical, biochemical, dietary survey)

COURSE CONTENT

Course Title : ELECTIVE III - NEW PRODUCT FORMULATION (T)	Course Code : 53C
Semester : V	Course Group : DSE- III
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: D (THEORY – APPLICATION)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSc-N&D# - Semester End Exam	

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Relate the characteristics of new food to the process of product development and discover its quality.	PS02	12	A
CO2	Prepare and produce a new food product.	PS02	12	A
CO3	Employ the standardization techniques and computing cost for the developed product.	PS02	11	A
CO4	Illustrate the functions and types of packaging materials. Interpret the role of packaging in marketing and recent developments in food packaging	PS02	7	A
CO5	Use the different types of labels and labeling requirements and laws for food packaging.	PS02	5	A
CO6	Sketch the basics in food marketing and apply different types of advertisement for sales promotion	PS02	13	A

UNIT I: (LECTURE HOURS =12)

Food Product Development: New food product (Introduction, definition)- Characteristics of new food products (Line extensions, repositioned existing product, new form or size of existing product, reformulation of existing product, repackaging of existing product, innovative products, creative products)- Process of product development (Idea generation, screening, feasibility, test marketing, commercialization)- Stages in product development process (Product strategy development, product design and process development, product commercialization)- Sources of delays in product development process (Technology risks, uncertainty about customer requirements, tradeoffs between performance and cost, variation in production)-Product Quality (Performance quality, design quality, production quality, service quality).

UNIT II: (LECTURE HOURS =12)

Recipe Development: Convenience foods (Definition, Energy bars, convenience meat products, fish based convenience foods)- RTS, RTE (Definition, examples of RTS and RTE foods)- Food fortification (Definition, fortified common salt, fortified cereals)- Biofortification (Definition, Importance, examples of biofortification)- Health food (Dietary fiber, probiotics and prebiotics)- Sports foods (Definition, energy requirements for different age groups, sports drinks)- Space foods (Definition, importance, packaging material used).

UNIT III: (LECTURE HOURS =11)

Standardization Of Food Products: Portion control (Significance of portion control)- Standardization (Elements of recipe standardization, standardized recipe format)- Cost and profitability calculation (Variable cost, fixed cost, profit goals, marketing channel, competitors, consumer demand)- Shelflife evaluation (Principles of sensory evaluation, Sensory and microbial testing of processed foods)

UNIT – IV:(LECTURE HOURS =12)

Packaging And Labelling:Introduction (Definition and functions of packaging)- Materials used for packaging (Flexible, semi rigid and rigid materials)- Packaging in marketing (Importance of packaging)

in marketing, packaging strategies, criticism of packaging)- Recent developments (Plastic crates, high barrier plastics, retortable pouches, micro-oven able packages, aseptic processing and packaging, MAP, GAP)- Labeling(Meaning, types of labels, statutory labeling requirement)- Laws related to packaging (Packaging and labeling of foods)- Nutrition labeling (Principles, codex guidelines) -Labeling provisions in existing food laws (Food safety and Standard Act).

UNIT –V(LECTURE HOURS =13)

MARKETING OF FOOD PRODUCTSIntroduction –(Definition and functions of marketing) Basic concepts in marketing (Consumer preferences, market trends, creativity)Planning and organization (Setting out a plan, product planning, product life cycle, new product and its planning, new product development and planning, target market, planning for promotion and marketing strategy) Marketing organization (Organization chart) Sales promotion (Meaning, functions, nature of sale promotion, importance, strategic management)Advertising and types of advertisement (Definition, importance, communication process, objectives and ethics, Newspaper, magazine, radio, television, directories, outdoor and transit, direct mail, catalogue and leaflet and online)

TEXT BOOKS :

T1.New Food Product Development: From Concept to Marketplace | Edition:III | CRC Press | Taylor and Francis AND Gordon W.Fuller(2011)

T2.Methods for Developing New Food Products: An Instructional Guide | Edition: | DEStech Publications, Inc. | FadiAramouni AND Kathryn Deschenes(2015)

T3.Food Product Development: Maximizing Success | Edition: | CRC Press, Woodhead Publishing Limited, England | Mary Earle, Richard Earle and Allan Anderson(2001)

T4.Foodservice Manual for Health Care Institutions | Edition:IV | John Wiley & sons, Inc | Ruby P. Puckett(2013)

T5.Functional Foods ,Nutraceuticals And Natural Products –Concepts And Application | Edition: | DES tech publications | DhirajA.Vattem and Vatsala Martin(2015)

T6.Handbook of nutraceuticals and functional foods | Edition:II | CRC PRESS, New York. | Robert E.C.wildmen(2007)

T7.Food science | Edition:VII | New age international publishers , Chennai. | B.Srilakshmi(2018)

T8.SPORTS NUTRITION | Edition:III | Human kineticts publishers | Asker Jeukendrup,Michealglee son (2018)

T9.HANDBOOK OF PACKAGING TECHNOLOGY | Edition: | India Research Institute,NewDelhi | Sudirgupta(2017)

Reference Books :

R1.SENSORY SHELF LIFE ESTIMATION OF FOOD PRODUCTS | Edition: | CRC PRESS,New York. | Guillermo Hough(2010)

Course Title : ELECTIVE III - NEW PRODUCT FORMULATION(P)	Course Code : 53C
Semester : V	Course Group : DSE - III
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M (PRACTICAL APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSC-N&D# - Semester End Exam	

EXPERIMENTS

1. Identification of ingredients and analysis of functional components
2. Planning and formulating a new product
3. Standardization, quality analysis and cost estimation of the new product
4. Selection of suitable packaging material and creating a label
5. Identification of target group and marketing the product

TEXT BOOKS :

T1.New Food Product Development: From Concept to Marketplace | Edition:III | CRC Press | Taylor and Francis and Gordon W.Fuller(2011)

T2.Methods for Developing New Food Products: An Instructional Guide | Edition: | DEStech Publications, Inc. | FadiAramouni and Kathryn Deschenes(2015)

T3.Food science | Edition:VII | New age international publishers , Chennai. | B.Srilakshmi(2018)

Reference Books :

R1.SENSORY SHELF LIFE ESTIMATION OF FOOD PRODUCTS | Edition: | CRC PRESS, New York. | Guillermo Hough(2010)

COURSE CONTENT

Course Title : ELECTIVE III - FOOD PRODUCTION AND AGRICULTURE (T)	Course Code : 53C
Semester : V	Course Group : DSE -III
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: C (THEORY – CONCEPTS)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Outline the significance of Agriculture and Food Production	PSO1	13	U
CO2	Explain the different farming practices	PSO1	12	U
CO3	Describe the production technology of local crops	PSO1	11	U
CO4	Review the basic knowledge on pests, insects and their control	PSO1	11	U

CO5	Recall fowl rearing practices	PSO1	6	U
CO6	Summarize the management of cattle rearing	PSO1	7	U

UNIT – I: (Lecture Hrs: 13)

INTRODUCTION:Introduction to Agriculture (Importance of Agriculture in the economy of a nation – Role of green revolution in food production)-Importance of soil, climate and systems of cultivation in food production (Types of soil – Dry land – irrigated wet land with respect to crops cultivated)-Importance of manuring (natural and synthetic fertilizers)-Tillage and its objectives (weeds and their control).

UNIT – II: (Lecture Hrs: 12)

Cultivation:Farming of Grains (A brief mention about the cultivation details of cereals (rice, cholam, wheat) pulses (red gram, black gram and green gram) and oil seeds (ground nut, sun flower)).

UNIT – III: (Lecture Hrs: 11)

Kitchen Gardening: Kitchen gardening (lay out, cropping scheme) – Importance of kitchen gardening (objectives) – advantages (site selection) – preliminary knowledge on propagation (grafting, layering, budding) – production technology of local crops (brinjal, tomato, ladies finger, cauliflower, cabbage, cucurbits and greens, importance of fruits and vegetable production).

UNIT – IV: (Lecture Hrs: 11)

Pest Control:Pesticides and Fungicides (Elementary knowledge on insects) – pests – fungal diseases and its control (one each) (basic knowledge regarding pesticides and fungicides and its application)-Storage pests (Importance and their control).

UNIT – V: (Lecture Hrs: 13)

Poultry and Dairying: Backyard poultry unit (rearing fowls in cage and deep litter system, basic knowledge about diseases affecting poultry, prevention and care)- Dairying (Importance milch breeds and cross breeds, housing, feeding and management of important diseases).

TEXT BOOKS

- T1. Choudhury B – Vegetables, Delhi : National Book Trust.
- T2. Vengateswaran P A – Agriculture in South India, New Delhi: Ministry of Agriculture.
- T3. Subbiah V T – Common cultivated crops of South India, Madras: Amutha Nilayam.
- T4. Subbiah V T – Hand book of Animal Husbandry and Dairying, Bangalore: Bangalore Press.

REFERENCE BOOKS

- R1. Hand book of Agriculture, Indian Agriculture Research Institute, New Delhi

Course Title : ELECTIVE III - FOOD PRODUCTION AND AGRICULTURE (P)	Course Code : 53C
Semester : V	Course Group : DSE- III
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M (PRACTICAL APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : 60 Marks
Programme: BSC-N&D	# - Semester End Exam

PRACTICAL EXPERIMENTS:

- Determination of soil moisture contents
- Study of crop production techniques at different farms
- Production of vegetables and fruits using kitchen garden
- Tests to identify the pesticide level in food
- Visit to a poultry and/ or cattle farm

TEXT BOOKS

- T1. Choudhury B – Vegetables, Delhi : National Book Trust.
- T2. Vengateswaran P A – Agriculture in South India, New Delhi: Ministry of Agriculture.
- T3. Subbiah V T – Common cultivated crops of South India, Madras: AmuthaNilayam.
- T4. Subbiah V T – Hand book of Animal Husbandry and Dairying, Bangalore: Bangalore Press.

REFERENCE BOOKS

- R1. Hand book of Agriculture, Indian Agriculture Research Institute, New Delhi

COURSE CONTENT

Course Title : ELECTIVE- HEALTH AND LIFESTYLE DISORDERS (T)	Course Code : 5EQ
Semester : V	Course Group : EDC
Teaching Scheme in Hrs (L:T:P) : 5:1:0	Credits : 6
Map Code: C (THEORY CONCEPT)	Total Contact Hours: 90
CIA: 25 Marks	SEE # : 75Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	Pos	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Discuss about food, nutrition, nutrients and health. Summarize the ICMR allowances, balanced diet and menu planning	PO1	10	U
CO2	Classify nutrients, discuss about macronutrients	PO1	7	U
CO3	Give the functions and sources of vitamins and minerals. Explain the functions of water.	PO1	18	U
CO4	Discuss about nutritional imbalance and diet to be modified	PO1	16	U
CO5	Express the dietary management of gastro intestinal tract and febrile conditions.	PO1	20	U
CO6	Describe about the causes and dietary management of lifestyle diseases and explain the benefits of exercise	PO1	19	U

UNIT I:**(LECTURE HOURS: 17)**

Introduction To Menu Planning: Terminologies associated with health (Definition of food, nutrition, nutrients, health and dimensions of health, Food, group-Basic IV)-Functional food groups (Energy yielding, Body building, Protection and regulation, Maintenance of health)-Balanced diet (Definition, Importance of balanced diet)-ICMR (Food allowance and nutrient allowance (Table))-Principles of menu planning (Factors to be considered while menu planning).**Over View Of Nutrients:**Classification (Macronutrients and micronutrients,)-Carbohydrate and fiber (Introduction, functions and sources)-Protein (Introduction, functions and sources)-Fat (Introduction, functions and sources). **Activity:** Prepare a balanced diet chart using food groups

UNIT II : (LECTURE HOURS: 18)

Vitamins: Introduction (Classification, Types- Fat soluble vitamins, Water soluble vitamins)-Fat soluble vitamins (Functions and sources of A,D,E,K)-Water soluble vitamins (Functions and sources of B-Complex vitamins, Vitamin C, Folic acid).**Minerals:** Classification (Macro minerals and micro minerals)-Macro minerals (Calcium, Phosphorus - Functions and sources)-Micro minerals (Iron, Iodine - Functions and sources).**Water:** Water (Functions of water and water balance).**Activity:**Submit a flipcharts, charts and calendar on functions and sources of vitamins.

UNIT III : (LECTURE HOURS: 16)

Nutritional Imbalance: Underweight (Definition, Causes and symptoms)-Treatment of underweight (Diet and exercise)-Obesity(Introduction , causes, grades of obesity)-Assessment of obesity (Body weight, Body mass index, Broka's index)-Complications of obesity (Cardio vascular disease, diabetes mellitus, hypertension, cancer)-Treatment of obesity (Life style modifications, Diet therapy, physical exercise).**Activity:** Calculate BMI and plan a balanced diet.

UNIT IV: (LECTURE HOURS: 20)

Diet For Gastro Intestinal Tract Diseases And Febrile Conditions: Constipation (Introduction, causes)-Types of constipation (Atonic constipation and spastic constipation)-Therapeutic management of Constipation(Principle of diet and dietary management and Life style modifications)-

Diarrhea(Definition, causes, symptoms)-Treatment of Diarrhoea (Importance of fluid and electrolyte balance, oral rehydration therapy)-Tuberculosis (Types, causative organism, clinical features)-Dietary management of Tuberculosis (Principles of diet, dietary management)-Typhoid (Introduction, symptoms)- Dietary management (Principles of diet, dietary suggestions).**Activity:** Plan a menu for patient suffering from constipation and diarrhea

UNIT V:**(LECTURE HOURS: 19)**

Life Style Diseases And Prevention: Diabetes mellitus (Definition, types, etiology, symptoms)-Dietary management and Lifestyle modification (Principle of diet , dietary management and life style modification)-Hypertension (Definition, causes, types, symptoms and dietary management).**Fitness And Health:**Fitness (Definition, types)-Benefits of exercise (Various benefits of exercises)-Factors influencing fitness (Age, sex, climate, diet, exercise and training)-Assessment of fitness (Flexibility, co-ordination, equilibrium, speed, agility).**Activity:** Submit the report about assessment of fitness for 5 of your classmates.

Text Books :

T1.FOOD SCIENCE | Edition:8 | New Age International (P) Limited .New Delhi | SRILAKSHMI B(2012)

T2.DIETETICS | Edition:5 | New Age International (P) Limited. New Delhi | SRILAKSHMI B (2011)

T3.TEXT BOOK OF HUMAN NUTRITION | Edition: | Oxford & IBH Publishing Co. PVT. LTD.New Delhi | VINODINI REDDY AND MAHATABS. BAMJ AND PRALHAD RAO N (2004)

T4.NUTRITION SCIENCE | Edition:4 | New Age International (P) Limited New Delhi | SRILAKSHMI B(2011)

Reference Books :

R1.MODERN NUTRITION IN HEALTH AND DISEASE | Edition:9 | Lippincott Williams and wikins, London | MAURICE E SHILS ANDWARDLAW(1999)

COURSE CONTENT

Course Title : ENTREPRENEURSHIP DEVELOPMENT (T)	Course Code : 54C
Semester : V	Course Group : SEC –G2- B
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: C (THEORY – CONCEPTS)	Total Contact Hours: 60
CIA: 100 Marks	SEE # : -
Programme: BSC-N&D# - Semester End Exam	

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Define fundamentals of entrepreneurship and entrepreneur and understand the characteristics of an entrepreneur	PSO4	12	R
CO2	Describe the theories of motivation, identify entrepreneurial competency and need for EDP in India	PSO4	12	U
CO3	Outline the process of starting a business	PSO4	13	R
CO4	Recognise the types of entity and various sources of finance	PSO4	8	U
CO5	Review the evolution of start up	PSO4	5	U
CO6	Translate the acquired knowledge of entrepreneurial skills to design project for setting up of a food processing industry	PSO4	10	U

UNIT I: (LECTURE HOURS: 12)

Introduction To Entrepreneurship: Meaning (Introduction, basic concepts of entrepreneurship)- Influencers (Internal and external)- Categories –(Entrepreneurship by chance, need, choice and force)- Entrepreneurship’s challenges (Lack of effective support, inadequate incubation facilities, education and training, mentoring and coaching, infrastructure challenges, cultural bottlenecks).**Entrepreneur:** Meaning (Definition, characteristics)- Difference between an Entrepreneur and a Manager (Entrepreneur and Manager).**Entrepreneurial India:**Evolution over centuries (India’s trials over centuries, The mindset in post-independence in India. Impact of liberalization, IT revolution).

UNIT II:;(LECTURE HOURS: 12)

Entrepreneurial Motivation:Introduction (Meaning and Definition)- Theories (Maslow’s need hierarchy theory - McClelland’s need for achievement theory).**Entrepreneurial Competencies:**Meaning and Definition (Motive, skill and knowledge)- Major competencies (Initiative, looking for opportunities, persistence, information seeker, quality conscious, committed to work, efficiency seeker, proper planning, problem solver, self confidence, assertive, persuasive, efficient monitor, employees well wisher, effective strategist)- Developing competencies (Competency recognition - self assessment- competency application- feedback)- Role of EDP’s –(Role- need - objectives and phases involved in EDP).

UNIT III: (LECTURE HOURS: 13)

Business Idea Generation:Ideation techniques (Brain storming, creative writing, wish lists, ideal scenario, campaigns, introspection).**Business Modeling:** Designing a business model (Business model canvas).**Business Planning:** Sections (Executive summary, introduction, description of business concept, product or service highlights, industry analysis and trends customer segment, competition, strategic position, risk assessment, marketing plan, sales, technology plan, exit plan)- Documentation tips (Focus on planning, prioritize the most important areas of business plan, develop research plan use a template). **Business Plan Review:** Business model review (Financial review, technical feasibility review).

UNIT IV: (LECTURE HOURS: 13)

Business Creation:Entity types (Sole proprietorship, partnership firm, private limited company, cooperatives, public limited company, joint hindu family, limited liability partnership)- Steps in setting up a unit (DIN id, digital certificate, reserving the company name, company incorporation, PAN, registration with shops, service tax, VAT, professional tax, PF, ESI scheme).**Project Finance:**Sources of finance (Internal sources and external sources)- Challenges in raising funds (Type of money, deciding the right time, how much to raise, source, rate of return, payback period, scalability).**Evolution Of A Start Up:** Key factors, evolution modeling, dimensions of maturity (Evolution, nature of business, starting stage, sustenance stage, scaling stage, entrepreneur as the driving force, entrepreneur and his team, emergency of supremacy of organization, systematization and process institutionalization).

UNIT V: (LECTURE HOURS:10)

Applications Of Entrepreneur Skills:Project profile (Introduction, Location, Statutory procedures, Arrangement for finance, Planning layout, Selection of Equipment, Electricity, Space, Working Capital)- Sample project report (Food processing industry).

Text Books :

T1.Entrepreneurship: Theory and practice | Edition: | Tata McGraw Hill, New Delhi | Raj Shankar (2009)

T2.Basic Baking, Science & Craft | Edition: | Mohan Printers, Bombay | Dubey SC (1993)

Reference Books :

R1.Entrepreneurial Development | Edition:4 | Chand and Co | Kanka S S(2012)

COURSE CONTENT

Course Title : FOOD PRESERVATION(T)	Course Code : 63A
Semester : VI	Course Group : DSC-XI
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: C (THEORY – CONCEPTS)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : -75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Explain the mechanism of spoilage and basic principles of food preservation	PSO4	9	U
CO2	Illustrate preservatives used in food industries	PSO4	7	A
CO3	Relate the use of high temperature methods in food preservation and dehydration	PSO4	11	A
CO4	Illustrate the various fermentation products and principle of semi moist foods	PSO4	10	A
CO5	Employ the different low temperature methods for food preservation	PSO4	12	A
CO6	Identify the recent trends in food preservation	PSO4	11	A

UNIT I:**(LECTURE HOURS: 16)**

Food Spoilage: Introduction (Definition, criteria for fitness of food for consumption)-Causes of spoilage (Intrinsic and extrinsic factors)- Types of spoilage (Physical, enzymatic, chemical and biological spoilage).**Food Preservation:** Introduction (Definition, need and principles of food preservation)- Methods of food preservation (Traditional and modern methods of food preservation).**Preservation By Using Preservatives:** Introduction (Definition and types of preservatives)- Preservation by using sugar (Role of sugar in food preservation , Theories of gel formation, problems in jam and jelly making)- Preservation by using salt, spices and condiments (Role of salt, spices and condiments in food preservation, Problems in pickle making)- Chemical preservatives (Classification, mode of action and optimum permitted levels).

UNIT II:**(LECTURE HOURS: 11)**

Preservation By Use Of High Temperature: Definition and Methods (Blanching, canning, pasteurization, sterilisation)- Process evaluation (Thermal heat time, Thermal death time, thermal death time curve, 12D concept)- Heat Penetration (Introduction and modes of heat penetration - Conduction, convection and radiation)-Calculation of process time (General method, graphic method and formula method)-Canning (Definition, steps involved in canning and spoilage of canned foods).**Preservation By Dehydration:** Introduction (Definition, general principles of dehydration and factors affecting dehydration)- Types of driers (Drum drier, vacuum shelf drier, continuous vacuum drier, spray drier, rotary drier, air lift drier, cabinet drier, kiln drier and tunnel drier).

UNIT III:**(LECTURE HOURS: 10)**

Preservation By Fermentation: Introduction (Definition, stages and types (Alcoholic Fermentation, Lactic Acid Fermentation, Propionic Acid Fermentation, Butyric Acid –Butanol, Fermentation and Mixed Acid Fermentation) of fermentation)- Fermented cereals and pulse based products (Idli, dosa, dhokla)-Fermented plant products (Fermented pickles - sauerkraut and dill pickles)- Fermented animal products (Yoghurt, cheese, Sausages).**Preservation Of Semi Moist Foods:** Semi moist human foods (Introduction, principle with example and storage of semi moist foods).

UNIT IV:(LECTURE HOURS: 12)

Preservation By Use Of Low Temperature:Introduction (Principle and types of low temperature preservation)- Refrigeration (Principle, types, advantages and disadvantages)- Refrigerant (Definition, properties of ideal refrigerant)- Freezing (Principle, methods of freezing, advantages and disadvantages)- Changes in food during freezing (Influence of freezing on microorganisms, proteins, vitamins and fats)- Freeze Drying (Introduction, principle and procedure).

UNIT V:, (LECTURE HOURS: 11)

Radiation Of Foods:Ultraviolet radiation (Introduction, effects of UV rays on humans and micro-organism and application in food industry)- Ionizing Radiation (Introduction, effects on microorganism and food, application of ionizing radiation in food industry)- Microwave heating (Introduction, properties, mode of action, application in food industry, advantages and disadvantages).**Recent Trends In Food Preservation:**Ohmic Heating (Principle and application)- Hurdle Technology (Principle and application)- Pulsed Electric Field (Principle and application)- High Pressure Processing (Principle and application).

Text Books:

T1.FOOD PROCESSING AND PRESERVATION | Edition: | Prentice Hall of India (P) ltd | SIVASANKARB(2002)

T2.FOOD MICROBIOLOGY | Edition:Edition:4 | Mc Green hill book | FRAZIERW.C(1995)

T3.THE TECHNOLOGY OF FOOD PRESERVATION | Edition:Edition:4 | CBS Publishers and Distributors.Newdelhi | JAMESNDESROISIER AND NORMAN.WDESROISIER(1987)

Reference Books:

R1.FOOD SCIENCE | Edition:3 | CBS Publishers,Newdelhi | NORMAN N.POTTER(1978)

R2. HANDBOOK OF FRUITS, VEGETABLES AND FOOD PROCESSING WITH CANNING AND PRESERVATION | Edition:| Asia's Pacific Business Press Inc | NIIR BOARD (1998).

Course Title : FOOD PRESERVATION (P)	Course Code : 63A
Semester : VI	Course Group : DSC-XI
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M(PRACTICAL APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE # : -60 Marks
Programme: BSC-N&D	# - Semester End Exam

PRACTICAL EXPERIMENTS:

1. Preservation by addition of sugar - jam and squash
2. Preservation by use of salt and spices - pickles, sauces and ketch up
3. Preparation of vadagam
4. Preparation of vathal
5. Preparation of fermented products - yoghurt, lassi, sauerkraut, dhokla and bread
6. Preparation of bottled drinks and ice cream
7. Preparation of baked products - cakes and biscuits

Text Books:

T1.FOOD PROCESSING AND PRESERVATION | Edition: | Prentice Hall of India (P) ltd | SIVASANKARB(2002)

T2.FOOD MICROBIOLOGY | Edition:Edition:4 | Mc Green hill book | FRAZIERW.C(1995)

T3.THE TECHNOLOGY OF FOOD PRESERVATION | Edition:Edition:4 | CBS Publishers and Distributors.Newdelhi | JAMESNDESROISIER AND NORMAN.WDESROISIER(1987)

Reference Books:

R1.FOOD SCIENCE | Edition:3 | CBS Publishers,Newdelhi | NORMAN N.POTTER(1978)

COURSE CONTENT

Course Title : ELECTIVE - IV FOOD SAFETY(T)	Course Code : 63C
Semester : VI	Course Group : DSE -IV
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: D(THEORY CONCEPTS)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : 75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Describe the historical significance, importance and issues in food safety	PSO3	12	U
CO2	Summarize the various hazards involved in food safety	PSO3	11	U
CO3	Discuss the hazards and safety issue of perishable foods	PSO3	8	U
CO4	Summarize the quality of water and microbial analysis of foods	PSO3	6	U
CO5	Review the hygiene and sanitary procedure to ensure food quality	PSO3	12	U
CO6	Explain the importance of Food Safety Management System	PSO3	11	U

UNIT I:**(LECTURE HOURS: 12)**

Introduction Of Food Safety: Food Safety (Definition, significance and concepts of food safety)- Background and Historical significance (Historical aspects of food safety)-Importance of food safety (Principles of food safety, causes of food borne illness, importance of food safety)- Issues in food safety

(Contaminants, food borne illness, food allergies, safety of food products, risk assessment).

UNIT II:

(LECTURE HOURS: 11)

Hazards To Food Safety: Food hazards (Definition and types of food hazards) -Physical toxicants (Non-edible substances, temperature and irradiation)- Chemical toxicants (Naturally occurring chemical hazards (Natural occurring toxicants in foods), Unintentional Chemicals (Pesticides, Fertilizers, Pollutants, Toxic metals), Intentional Chemicals (Food preservatives and food additives))- Biological toxicants and associated food sources (Microbial toxicants (Bacterial, fungal, viral, parasites)- Toxicity of food additives (Toxic effect of food additives)).

UNIT III:

(LECTURE HOURS: 14)

Safety Issues In Perishable foods: Meat (Introduction, safety issues - Antemortum inspection, post-mortem, inspection, meat processing unit)-Milk (Introduction, importance of milk quality, quality control to achieve hygienic production and marketing)-Beverages (Introduction, safety aspects of beverages)- Fruits and Vegetables (Introduction, quality attributes, safety hazards associated with fresh fruits and vegetables).**Quality Of Water:** Sanitary aspects of water supply (Steps in purification of water, criteria to judge the quality of water, water quality standards, sewage and contamination of water supply).**Microbial Analysis Of Foods:** Types of media (Selective, enrichment, differential media)-Preparation of media (Steps in preparation)-Measurement of microbial growth (Direct and Indirect methods)- Methods of isolating pure culture (Pour plate, spread plate and streak plate techniques).

UNIT IV:

(LECTURE HOURS: 12)

Role Of Food Handlers In Food Safety: Introduction (Definition of food hygiene and food handlers) - Responsibilities of food handlers (Hand washing practices, good personal hygiene, clean work attire, management of illness, safe food practices)- Management and Sanitation (Sanitation training and education, advantages of training programming).**Sanitary Practices In Preparing:** Introduction (Importance of sanitary practices).**Holding, Serving And Displaying Food:**Procedures to minimize microbial load (Preparing food, cooking food, hot holding of foods, storage temperature of prepared foods, basic rules to be observed during food serving and protective display of food).

UNIT V:

(LECTURE HOURS: 11)

Food Safety Management System: Ensuring food safety (Introduction, need for food safety management system)- Food safety management system certification (Audit approach, focus on food safety, transparency, supply chain approach, integrity program)-Safe Quality Foods (SQF) (Introduction, certification, steps to SQF certification)- HACCP (Definition, steps involved in HACCP certification and implementation)- ISO (Introduction, role of ISO in food safety).

Text Books:

T1. Food Safety Theory and Practice | Edition: | Jones and Bartlett Learning, Burlington Paul L. Knechtges(2012)

T2. Food safety and human Health | Edition: | Academic Press, UK | Ram lakhanSingh and SukantaMondal (2019)

T3. Food Hygiene and Sanitation with Case Studies | Edition:Second Edition | McGraw Hill Education (I) Pvt Ltd | Sunetraroday(2011)

T4. Food Safety Implementation from Farm to Fork | Edition: First Edition | CBS Publishers and Distributors Pvt Ltd | Puja Du and Amarjeet Singh and Sukhpa Kaur (2016)

Reference Books:

R1. Food safety and toxicity | Edition: | CRC Press | John deVries(1997)

COURSE CONTENT

Course Title : ELECTIVE - IV FOOD SAFETY(P)	Course Code : 63C
Semester : VI	Course Group : DSE -IV
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M(PRACTICAL APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE #: 60 Marks
Programme: BSC-N&D	# - Semester End Exam

PRACTICAL EXPERIMENTS

1. Identification of physical hazards in foods
2. Assessment of food preservatives for microbial growth
3. Milk quality analysis - MBRT test
4. Analysis of microbial spoilage of fruits/vegetables
5. Quality analysis of water by MPN method
6. Assessment of personal hygiene by swab method
7. Assessment of surface sanitation by swab and rinse method -Open plate method
8. Analysis of microbial load of utensils- serial dilution
9. Training on HACCP

Text Books:

T1. Food Safety Theory and Practice | Edition: | Jones and Bartlett Learning, Burlington

Paul L Knechtges(2012)

T2.Food safety and human Health | Edition: | Academic Press, UK | RamLakhanSingh and SukantaMondal (2019)

T3. Food Hygiene and Sanitation with Case Studies | Edition:Second Edition | McGraw Hill Education (I) Pvt Ltd | Sunetraroday(2011)

T4.FoodSafetyImplementationfromFarmtoFork|Edition:FirstEdition|CBSPublishersandDistributorsPvt Ltd |Puja Du and AmarjeetSingh and SukhpaKaur(2016)

Reference Books:

R1.Food safety and toxicity | Edition: | CRC Press | John deVries(1997)

COURSE CONTENT

Course Title : ELECTIVE - IV FOOD TOXICOLOGY (T)	Course Code : 63C
Semester : VI	Course Group : DSE -IV
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: D(THEORY CONCEPTS)	Total Contact Hours: 60
CIA: 25 Marks	SEE # : -75 Marks
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Describe the various food toxicants and intentional food additives	PSO3	12	U
CO2	Summarize the various unintentional food additives	PSO3	11	U
CO3	Discuss the natural toxicants in food	PSO3	8	U
CO4	Summarize the metal toxicants in food	PSO3	6	U
CO5	Review the antinutritional factors in food	PSO3	12	U
CO6	Explain the consequence of Food borne diseases and food borne illness	PSO3	11	U

UNIT I**Lecture Hrs: 12**

Food toxicology: Definition, toxic potential of foods, classification of food toxicants, factors affecting toxicity of compounds and lethal dose. **Intentional food additives-** Chemical preservatives, nitrogen compounds, radiations, antioxidants, sweeteners, flavour and flavour enhancers, food colours, stabilizers, thickeners and vitamins.

UNIT II**Lecture Hrs: 11**

Indirect/ unintentional food additives: Antimicrobial drugs, pesticides, plastic/ packaging materials, poly cyclic aromatic hydro carbons (PCB) and poly hydrogenated biphenyls (PBB). **Neuro stimulants-** MSG, Caffeine, Tannin.

UNIT III**Lecture Hrs: 14**

Naturally occurring toxicants in foods: Toxicants in food grains, legumes milk, fleshy foods sea foods, oils, spices, canned foods, alcoholic and non-alcoholic beverages, nuts, mushroom, preservatives **Metal toxicity:** Selenium, zinc, arsenic, lead, cadmium, cobalt, copper, tin, mercury- food sources and toxicity.

UNIT IV**Lecture Hrs: 12**

Anti nutritional factors in foods: Haemagglutinins, trypsin inhibitors, digestive protease inhibitors, lectins, cyanogenetic glycosides, goitrogens, lathyrogens, carcinogens, polyphenols, mustard oil toxicity, phytates and saponins. Antivitamins and anti minerals.

UNIT V**Lecture Hrs: 11**

Food borne diseases: Classification and mode of transmission. **Food borne illness:** Food poisoning and food infection (staphylococcus food intoxication, botulism, perfringes, salmonellosis, shigellosis, cholera)- infectious hepatitis and dysentery (organism, mode of transmission, symptoms, foods involved, toxins, incubation period, duration of illness, therapy and prevention).

TEXT BOOKS

- T1. A text book of nutrition – Chintapalli Vidya, Discovery Publication House, New Delhi.
- T2. Food Science, Nutrition and Health – Brian A. Fox, Allen G Cameron, Edward Arnold Publication, London.
- T3. Nutritional Biochemistry – S. Ramakrishnan, S. Venkat Rao T.R. Publication.
- T4. Food Poisoning and prevention – Greg Merry, 2nd edition.

REFERENCE BOOKS

- R1. Food Hygiene and Sanitation – S Roday, Tata Mc.Graw Hill Publication Company, New Delhi.
- R2. Food poisoning and Food Hygiene – Betty C Hobbs, Richard J Gilbert.
- R3. Text book of human nutrition – Mahtab S Bamji, N Prathab Rao, Vinodini Reddy, Oxford and IBH Publication Co., New Delhi.

COURSE CONTENT

Course Title : ELECTIVE - IV FOOD TOXICOLOGY(P)	Course Code : 63C
Semester : VI	Course Group : DSE -IV
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M(PRACTICAL APPLICATION)	Total Contact Hours: 60
CIA: 40 Marks	SEE #: 60 Marks
Programme: BSC-N&D	# - Semester End Exam

PRACTICAL EXPERIMENTS

1. Identification of incidental food hazards in foods
2. Identification of accidental food hazards in foods
3. Identification of natural toxicants present in food
4. Test to assess the present of aflatoxins in food
5. Analysis of microbial spoilage of fruits/vegetables

TEXT BOOKS

- T1. A text book of nutrition – Chintapalli Vidya, Discovery Publication House, New Delhi.
 T2. Food Science, Nutrition and Health – Brian A. Fox, Allen G Cameron, Edward Arnold Publication, London.
 T3. Nutritional Biochemistry – S. Ramakrishnan, S. Venkat Rao T.R. Publication.
 T4. Food Poisoning and prevention – Greg Merry, 2nd edition.

REFERENCE BOOKS

- R1. Food Hygiene and Sanitation – S Roday, Tata Mc.Graw Hill Publication Company, New Delhi.
 R2. Food poisoning and Food Hygiene – Betty C Hobbs, Richard J Gilbert.
 R3. Text book of human nutrition – Mahtab S Bamji, N Prathab Rao, Vinodini Reddy, Oxford and IBH Publication Co., New Delhi.

COURSE CONTENT

Course Title : FOOD QUALITY CONTROL (T)	Course Code : 63B
Semester : VI	Course Group: DSC - XII
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4
Map Code: D(THEORY CONCEPTS)	Total Contact Hours: 60
CIA: 25	SEE # : 75
Programme: BSC-N&D	# - Semester End Exam

No	Course Outcome (Cos): After completion of this course, the students will be able to	PSOs	Cl.Ses	BLOOM'S TAXONOMY LEVEL
CO1	Paraphrase the principles and significance of quality control and recognize the quality factors for consumer safety in food industry	PSO3	11	U
CO2	Illustrate the common food adulterants and infer the objectives and functions voluntary international certifying agencies	PSO3	9	A
CO3	Schedule the objectives and functions of various food laws	PSO3	8	A
CO4	Identify the functional characteristics of food additives and summarize the types and uses of various additives	PSO3	13	U
CO5	Demonstrate the different aspects of sensory evaluation and show the use of subjective evaluation	PSO3	10	A
CO6	Show the use of objective evaluation as an analytical tool	PSO3	9	A

UNIT 1**(LECTURE HOURS: 11)**

Quality Control Of Foods :Principles of quality control of foods (Raw material control, processed control and finished product inspection)-Significance of quality control in food industry (Food industry with special reference to fruit processing and Dairy industry)-Planned quality control (Role of quality control department in a food industry)-Consumerism (Definition of consumer, rights and responsibilities of consumer)-Consumer Protection Act (Objective and functions of consumer protection act)-Role of consumer protection act (Significance of consumer protection act)-Quality factors for consumer safety (Nutritional quality, sanitary quality and keeping quality of foods)

UNIT II**(LECTURE HOURS: 13)**

Adulteration: Food adulterant (Definition, types, common adulterants in foods and tests to detect common adulterants)-Food laws (Introduction, types). **Voluntary Certifying Agencies:** ISI (Objectives, functions and significance)- AGMARK(Objectives, functions and significance) **International Certifying Agencies:** ISO (Objectives, functions and significance)- Codex alimentarius (Objectives, functions and significance).**Mandatory Food Loss:** FSSAI (Introduction)(Salient features and Scope of the act)(Functions of authority)(Regulatory enforcement at state)(Roles and responsibility of food safety officer and licensing and registration of food business).

UNIT III**(LECTURE HOURS: 13)**

Food Additives: Basics of additives (Definition, functional characteristics and intentional food additives, uses)-Leavening agents (Types and its uses)-Colouring agents (Natural and artificial colours,its uses)-Flavouring agents (Definition, types and its uses)-Preservatives (Class I Preservative and Class II preservative , uses)-Emulsifier (Types of emulsion and its uses)-Stabilizers, thickeners, antioxidants (Common stabilizers, thickeners and antioxidant and its uses)- PFA specifications for food additives (Colouring matter, leavening, flavouring, preservatives, and antioxidant).

UNIT IV**(LECTURE HOURS: 10)**

Evaluation Of Food Quality: Introduction to Sensory Evaluation and quality methods (Definition and importance of sensory evaluation, types)(Quality attributes -appearance, flavour, texture and additional quality factors).**Subjective Evaluation Of Food Quality:** (Practical Requirements and General Testing Conditions - Testing area, testing set up lighting, testing schedule, preparation of samples, sample coding, evaluation card preparation, Trained and untrained panel members)-Sensory Assessment of Food Quality(Taste(Gustation), odour and flavour (olfaction), colour, texture and other sense- Introduction and importance)- Different methods of sensory analysis (Difference test, Rating

test, sensitivity test, descriptive test)-Score card (Definition, preparation and significance of score card).

UNIT V

(LECTURE HOURS: 9)

Objective Evaluation Of Food Quality: Objective evaluation (Definition, basic guidelines, advantages and disadvantages)- Tests used for objective evaluation (Chemical methods of objective evaluation, physio-chemical methods, microscopic examination, physical methods)- Instruments used for texture evaluation (Instruments used for solids Instruments used for liquids and semisolids).

Text Books:

T1. THE TECHNOLOGY OF FOOD PRESERVATION | Edition: Edition:4 | CBS Publishers and distributors New Delhi | NORMANW.DESROIER(1987)

T2. FOOD SCIENCE | Edition: Edition: 5 | CBS Publishers, New Delhi | NORMANNPOTTER (1996)

Reference Books:

R1. Food microbiology | Edition: Edition: 4 | Tata McGraw- Hill Publishing Company | Frazierw.C(1995)

R2.food preservation and safety | Edition: | Surabhi Publications, Jaipur | Hirley J Vagrade(1999)

R3.Sensory Evaluation of Food-Theory and Practice, . | Edition: | Elis Horwood Ltd., England | Jellinek. G(1985)

R4.Food Science | Edition: | New Age International (P) Limited., New Delhi | Srilakshmi,B(2005)

R5. Food Facts and Principles, | Edition: | New Age International (P) Limited., New Delhi | Manay,S And Shadaksharaswamy,M(2008)

COURSE CONTENT

Course Title : FOOD QUALITY CONTROL (P)	Course Code : 63B
Semester : VI	Course Group: DSC- XII
Teaching Scheme in Hrs (L:T:P) : 0:0:4	Credits : 2
Map Code: M (PRACTICAL APPLICATION)	Total Contact Hours: 60
CIA: 40	SEE # : 60
Programme: BSC-N&D	# - Semester End Exam

PRACTICAL EXPERIMENTS

1. Visits to the quality control laboratories of the food industry –
2. Detection of adulteration in food products. –
3. Detection of non-permitted food additives in market food samples
4. Test of sensory evaluation
5. Preparation of score card
6. Laboratory preparation of food products and their sensory analysis -
7. Detection of basic tastes and their threshold values

Text Books:

T1. THE TECHNOLOGY OF FOOD PRESERVATION | Edition: Edition:4 | CBS Publishers and distributors New Delhi | NORMANW.DESROIER(1987)

T2. FOOD SCIENCE | Edition: Edition: 5 | CBS Publishers, New Delhi | NORMANNPOTTER (1996)

Reference Books:

R1.Sensory Evaluation of Food-Theory and Practice, . | Edition: | Elis Horwood Ltd., England | Jellinek. G(1985)

R2.Food Science | Edition: | New Age International (P) Limited., New Delhi | Srilakshmi,B(2005)

R3. Food Facts and Principles, | Edition: | New Age International (P) Limited., New Delhi | Manay,S And Shadaksharaswamy,M(2008)

COURSE CONTENT

Course Title : PROJECT AND VIVA VOCE-DIETETICS CASE STUDY(P)	CourseCode : 63R
Semester : VI	CourseGroup : DSE- V - 1
Teaching Scheme in Hrs (L:T:P) : -	Credits : 6
Map Code : I (PROJECT)	TotalContactHours: -
CIA : 40 Marks	SEE #: 60 Marks
Programme: B.SC Nutrition and Dietetics	# - Semester EndExam

UNIT I**(LECTURE HOURS: 72)**

Diabetes Mellitus: Personal details, medical profile of the patients and diet therapy (Dietary Department, Layout, organization chart and various hospital diets, Report writing Preparation of report). **Cardiovascular Diseases:** Personal details, medical profile of the patients and diet therapy (Dietary Department, Layout, organization chart and various hospital diets, Report writing Preparation of report). **Gastro Intestinal Diseases:** Personal details, medical profile of the patients and diet therapy (Dietary Department, Layout, organization chart and various hospital diets, Report writing Preparation of report). **Enteral Feeding:** Personal details, medical profile of the patients and diet therapy (Dietary Department, Layout, organization chart and various hospital diets, Report writing Preparation of report).

Reference Books:

R1. DIETETICS | Edition: EDITION 6 | NEW AGE INTERNATIONAL Pvt.Ltd ,New Delhi | Srilakshmi B(2012)

COURSE CONTENT

Course Title : INDUSTRIAL EXPOSURE TRAINING REPORT – VIVA VOCE (P)	CourseCode : 63R
Semester : VI	CourseGroup : DSE– V - 2
Teaching Scheme in Hrs (L:T:P) : -	Credits : 6
Map Code : J (TRAINING)	TotalContactHours: -
CIA : 40 Marks	SEE #: 60 Marks
Programme: B.SC Nutrition and Dietetics	# - Semester EndExam

- During the VI Semester the Students will be divided into various groups and each group will be assigned a topic. The Project will be submitted at the end of the VI Semester and will be jointly evaluated by the Internal and External Examiner.