POLYTECHNIC IN FOOD SCIENCE & HE

DIPLOMA IN NUTRITION AND DIETETICS

FACULTY OF FOOD PROCESSING TECHNOLOGY & BE
ANAND AGRICULTURAL UNIVERSITY, ANAND-388 110
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No. AAU/FPT-BE/Acad/ 785 /2024,

Date :25/ 7/2024

Endorsement for the Programme specific outcomes, Programme outcome, and Course Outcomes Mapping of Diploma Nutrition & Dietetics curriculum

Anand Agriculture University has undertaken the task of initiating and introducing three year polytechnic programme, first time in nation leading to Diploma in various fields of agriculture and allied sciences i.e. Agriculture, Horticulture, Agricultural engineering etc. Accordingly Diploma in Nutrition & Dietetics course has been formulated and advocated along with meticulously curated syllabi. The course and syllabi have been structured with integral importance placed on precision and alignment with academic standards. They serve as a beacon of academic integrity and rigor, aimed at fostering a harmonized educational landscape within the realm of Nutrition & Dietetics. The recommendations committee set for syllabi have been duly endorsed and ratified, reflecting the discerning evaluation and unwavering commitment to educational excellence. This initiative has been executed with careful consideration of meticulous deliberations and diligent efforts by committee member from various fields like government scoter, other universities, agricultural universities etc.

Diploma Nutrition & Dietetics curriculum is herewith delineates and articulates for the Programme Specific Outcome, Programme Outcomes, and Course Outcomes, Meticulously and mapped to ensure a comprehensive and coherent educational framework. The undersigned hereby affix our official seal and endorsement thereby granting unequivocal approval.

PRINCIPAL & DEAN

Course Titles for the Diploma in Nutrition & Dietetics

Sr. No.	Course No.	Course Title	Credit	Page No.
SUPPORTIVE COURSES				
1.	SC 111	Basic Chemistry	2+1	33
2.	SC 112	Basic Physics	2+1	34
3.	SC 113	Agricultural and Animal Science	2+1	35
4.	SC 114	Anatomy and Physiology	1+2	36
5.	SC 115	Introduction to Computer	1+2	37
6.	SC 116	Communication Skills I	1+1	38
7.	SC 121	Applied Mathematics	2+1	40
8.	SC 122	Basic Biochemistry	2+1	42
9.	SC 123	Communication Skills II	1+1	44
10.	SC 311	Entrepreneurship Development	1+1	47
Total			**15+12=27**	
FOOD SCIENCE				
11.	FS 121	Food Science	2+1	19
12.	FS 122	Food Microbiology	2+1	21
13.	FS 211	Food Chemistry	2+1	22
14.	FS 212	Food Production and Patisserie I	1+2	24
15.	FS 213	Food Preservation and Storage	2+1	25
16.	FS 221	Food Analysis and Quality Assurance	1+2	26
17.	FS 222	Food Formulation	1+1	27
18.	FS 223	Food Production and Patisserie II	1+2	28
19.	FS 311	Food and Beverage Services	1+2	30
20.	FS 312	Convenience and Health Food	1+2	32
Total			**14+15=29**	
NUTRITION AND DIETETICS				
21.	ND 211	Health, Hygiene and Sanitation	1+1	03
22.	ND 212	Human Nutrition	2+2	05
23.	ND 213	Meal Planning	1+2	06

24.	ND 121	Basic Nutrition	2+1	01
25.	ND 221	Diet Therapy	2+1	07
26.	ND 222	Maternal and child Nutrition	2+1	08
27.	ND 223	Community Nutrition	1+1	10
28.	ND 224	Public Health and Epidemiology	1+1	12
29.	ND 311	Nutritional Assessment	2+2	14
30.	ND 312	Therapeutic Nutrition	2+1	15
31.	ND 313	Hospital Dietetics and Patient Counseling	2+1	17
32.	ND 321	Training and Project Report	0+20	18
Total			**18+34=52**	
Supportive				
21		NSS / NCC / Sports	NC	
22		NSS / NCC / Sports	NC	
GRAND TOTAL			**47+61=108**	

Course Titles for the Diploma in Nutrition & Dietetics

Sr. No.	Course No.	Course Title	Credit	Page No.
I Semester				
1	SC 111	BASIC CHEMISTRY	2+1	36
2	SC 112	BASIC PHYSICS	2+1	37
3	SC 113	AGRICULTURAL AND ANIMAL SCIENCE	2+1	38
4	SC 114	ANATOMY AND PHYSIOLOGY	1+2	39
5	SC 115	INTRODUCTION TO COMPUTER	1+2	40
6	SC 116	COMMUNICATION SKILLS-I	1+1	41
7		NSS / NCC / SPORTS	0+1 (NC)	
Total			**9+8=17**	
II Semester				
8	SC 121	APPLIED MATHEMATICS	2+1	43
9	SC 122	BASIC BIOCHEMISTRY	2+1	44
10	SC 123	COMMUNICATION SKILLS-II	1+1	46
11	ND 121	BASIC NUTRITION	2+1	03
12	FS 121	FOOD SCIENCE - I	2+1	23
13	FS 122	FOOD MICROBIOLOGY	2+1	25
14		NSS / NCC / SPORTS	0+1 NC	
Total			**11+6=17**	
III Semester				
15	ND 211	HEALTH, HYGIENE AND SANITATION	1+1	05
16	ND 212	HUMAN NUTRITION	2+2	07
17	ND 213	MEAL PLANNING	1+2	08
18	FS 211	FOOD CHEMISTRY	2+1	26
19	FS 212	FOOD PRODUCTION AND PATISSERIE-I	1+2	28
20	FS 213	FOOD PRESERVATION AND STORAGE	2+1	29
21		NSS / NCC / SPORTS	0+1 NC	
Total			**9+9=18**	
IV Semester				
22	ND 221	DIET THERAPY	2+1	09
23	ND 222	MATERNAL AND CHILD NUTRITION	2+1	11
24	ND 223	COMMUNITY NUTRITION	1+1	13
25	ND 224	PUBLIC HEALTH AND EPIDEMIOLOGY	1+1	15

26	FS 221	FOOD ANALYSIS AND QUALITY ASSURANCE	1+2	30
27	FS 222	FOOD FORMULATION	1+1	31
28	FS 223	FOOD PRODUCTION AND PATISSERIE-II	1+2	32
29		NSS / NCC / SPORTS	0+1 NC	
Total			**9+9=18**	
Sr. No.	**Course No.**	**Course Title**	**Credit**	**Page No.**
V Semester				
30	ND 311	NUTRITIONAL ASSESSMENT	2+2	17
31	ND 312	THERAPEUTIC NUTRITION	2+1	19
32	ND 313	HOSPITAL DIETETICS AND PATIENT COUNSELING	2+1	21
33	FS 311	FOOD AND BEVERAGE SERVICES	1+2	33
34	FS 312	CONVENIENCE AND HEALTH FOOD	1+2	35
35	SC 311	ENTREPRENEURSHIP DEVELOPMENT	1+1	49
Total			**9+9=18**	
VI Semester				
36	ND 321	TRAINING AND PROJECT REPORT	0+20	22
Total			**0+20=20**	
GRAND TOTAL			**47+61=108**	

Syllabus of Polytechnic Programme of Nutrition and Dietetics

Objectives of Programme

- To conduct academic program leading to Diploma in Nutrition and Dietetics to develop human resources in the respective field.
- To carry out extension activities in the above areas keeping the liaison with the different agencies for effective training and transfer of technologies.
- To carry out basic research to support education and extension activities.
- To develop a perspective for multi-disciplinary experience.

Program Outcome (PO)

1. Develop knowledge and understanding of the academic field of study as a whole and its applications, and links to related disciplinary areas/subjects of study; including various activities in the area of food processing, food preservation, food science, food quality assurance, human nutrition and dietetics.
2. Develop knowledge that creates different types of professionals related to the subject area of food science, human nutrition and dietetics, teaching and government and public service.
3. Develop skills in areas related to food science, foods and nutrition and dietetics.
4. Develop self-employment and to get higher education in the respective fields.

Program Specific Outcome (PSO)

1. Develop the basic knowledge and concepts that are required for food processing, nutrition and dietetics sectors.
2. Expose students to higher education with tools/techniques to carry out various activities in food and nutrition domain.
3. Aware the students for use of technologies and instruments in the field of food and nutrition and dietetics.
4. Develop basic skills in the area of food science, nutrition and dietetics.
5. Develop student for successful academic and industrial carrier in the food processing, as well as nutrition and dietetics.
6. To impart knowledge of professional and ethical responsibilities toward the society.

Mapping between POs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
PO1						
PO2						
PO3						
PO4						

PO = Program outcome with PSO = Program Specific outcome

Semester I

Basic Chemistry (SC 111)

<table>
<tr><td>Course code</td><td>SC 111</td></tr>
<tr><td>Course title</td><td>Basic Chemistry</td></tr>
<tr><td>Course credit</td><td>3 (2+1)</td></tr>
<tr><td>Teaching per week</td><td>4 h</td></tr>
<tr><td>Course objectives</td><td>1. Understand principle of chemistry and their application in human nutrition and food processing.
2. To acquaint students with application of basic knowledge of chemical ingredients and various organic products.</td></tr>
<tr><td>Course content</td><td>Theory :
1. Basic concept of chemistry : Importance, units, element, compound and mixture, states of matters, structure of atom, atomic weight, molecules, molecular weight, equivalent weight, valencey, symbol, chemical formulas and equitation.
2. Physical and chemical changes : Types of chemical reactions, factors effecting chemical reactions.
3. Acid and Base : Acid – definition, strength, properties and useful acids; base – definition, strong and weak base, properties and useful base; pH scale – explanation, measurement, formula, importance of pH scale.
4. Solution : Types, methods of preparing standard solution.
5. Specific gravity, melting point, boiling point, crystallization etc.
6. Organic chemistry : Sources of organic chemicals, classification of organic compounds and their formula, functional groups and homologues series.
7. Environmental studies : Introduction, nature of environment and its problems - environmental degradation, greenhouse effect, acid rain, ozone depletion etc; public awareness.
Practical :
1. Acidity and alkalimeter titration.
2. Determination of pH of the given solutions – baking sods, vinegar, milk, tomato juice, water etc.
3. Measuring boiling point, melting point, specific gravity etc.
4. Detection of elements in organic compounds like carbon, hydrogen, nitrogen, sulphur, phosphorus etc.
5. Identification of functional groups like aldehyde, ketone, carboxylic acid, ester, alcohol, phenol, amines, nitro groups etc.
6. Detection of carbohydrate, amino acids, proteins etc.
7. Preparation of standard solutions.</td></tr>
<tr><td>References :</td><td>1. Soni PL (1984) : Fundamental Chemistry, Sultan Chand and Sons, New Delhi.
2. Jacob MMS (1979) : Textbook of Applied Chemistry,
3. Bhal BS (1964) : Elementary Organic Chemistry, S. Chand and Co., New Delhi.</td></tr>
<tr><td>Course outcomes (CO)</td><td>CO1 : Aware about chemistry and its application in human nutrition and in food industry
CO2 : Develop skills of basic analytical methods for food analysis used in food industries</td></tr>
<tr><td>Mapping between COs and PSOs</td><td>
<table>
<tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td><td>PSO6</td></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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Basic Physics (SC 112)

Course code	**SC 112**
Course title	**Basic Physics**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. To provide basic knowledge related to physics. 2. Acquaint with principles of physics and their application in different food processing and other instruments.
Course content	**Theory :** 1. Introduction to properties of matter, solid and gases. 2. Measurements and systems of units. 3. Work, energy and power. 4. Simple machine, a brief introduction to mechanical advantages and efficiency -Liver, scissors, holding tongs, nut cracker, rollers and greeters, eggbeaters. 5. Screw and pulleys, crock openers, onion cutter, egg beater etc. 6. Forces : Centripetal and centrifugal forces, spin dryer, gravitational forces and its advantages and utilization in food science etc. 7. Friction : Advantages and disadvantages, concept of ball bearing, vacuum cleaner etc. 8. Light : Introduction to light, properties of light, velocity of light, theories of light – quantum, wavelength, colour – sources of colour, physical properties of material, responses of eye colour, simple mirror and lens. 9. Renewable and non-renewable energy sources : Resources, classification, destruction, conservation of energy, problems of energy. **Practical :** 1. To find out refractive index of the glass. 2. To find out focal length of a concave mirror. 3. To find out the focal length of the convex lens. 4. Utilization of various laws of the physics in food science.
References :	1. Bhings RH and Sharma GM (1996) : Practical Physics, Pragati Prakashan, Bombay.
Course outcomes (CO)	**CO1 :** Aware about physics and its application in human nutrition and in food industry **CO2 :** Develop skills of basic calculative methods for food analysis used in food industries
Mapping between COs and PSOs	See table below

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						

Agricultural and Animal Science (SC 113)

Course code	**SC 113**
Course title	**Agricultural and Animal Science**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. To enable students to understand the significance of agriculture science. 2. To acquaint students with different crop production practices.

<table>
<tr><td></td><td>3. To enable students to understand the significance of animal science.
4. To acquaint students with different mode of animal farming entrepreneurship.</td></tr>
<tr><td>Course content</td><td>Theory :
1. Soil - definition, types and significance.
1. Classification of agricultural crops, their economic importance, intensive agriculture system / techniques of main crops of Gujarat.
2. Horticulture : Definition and need, main crops of Gujarat.
3. Kitchen Garden : Definition and importance, methods to prepare kitchen garden.
4. Different techniques / methods to store vegetables and precautions while harvesting vegetables.
5. Tissue culture and its importance.
6. Significance of livestock farming in human life.
7. Agriculture and animal farming.
8. Clean milk production : Importance, milking methods, ways to procure clean milk.
9. Different breeds of poultry and egg.
Practical :
1. Identification and usage of various hand tools and machine tools used for agricultural and horticultural work.
2. Identification and care of different seeds of various crops.
3. Preparation of poisonous baits for control of rodents.
4. Direct study of different methods of plant propagation.
5. Crop demonstrations and its objectives.
6. Preparation of kitchen garden.
7. Study of the methods of animal identification and estimating the approximate weights of animals.
8. Visit to progressive farmer's farm, poultry farm, livestock farm, district milk dairy.</td></tr>
<tr><td>References :</td><td>1. ICAR (2006) : Handbook of Agriculture, Indian Council of Agricultural Research, New Delhi.
2. ICAR (2006) : Handbook of Animal Husbandry, Indian Council of Agricultural Research, New Delhi.</td></tr>
<tr><td>Course outcomes (CO)</td><td>CO1 : Aware about agricultural science and crop production practices
CO2 : Aware about animal science and animal farming entrepreneurship.</td></tr>
<tr><td>Mapping between COs and PSOs</td><td>
<table>
<tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td><td>PSO6</td></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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Anatomy and Physiology (SC 114)

Course code	**SC 114**
Course title	**Anatomy and Physiology**
Course credit	**3 (1+2)**
Teaching per week	**5 h**
Course objectives	1. To understand the structure of organs of the body and their functions. 2. To understand the different systems of the body and their functions with special reference to digestion, absorption, transport and uptake of nutrients and elimination of waste products.

Course content	**Theory :** 1. Structure : Plant and animal cell. 2. Digestive system : Brief study of anatomical organization of the digestive tract;process of digestion, absorption and assimilation of food. 3. Circulatory system : Heart- structure and function, blood vessels and their function, composition and functions of blood, blood coagulation, blood groupings. 4. Respiratory systems : Basic anatomy of respiratory system and process of respiration. 5. Excretory system: The excretory organs – structure and their functions. 6. Reproductive system : Anatomy of the male and female reproductive organs – menstrual cycle, conception and contraception, secretion of milk. **Practical :** 1. Estimation of haemoglobin. 2. Determination of blood group. 3. Haematocrit and sedimentation rate. 4. Preparation of blood slide. 5. Identification and counting of blood cells. 6. Measurement of blood pressure. 7. Estimation of normal constituents of urine.
References :	1. Wilson JW and Kathben (1987) : Anatomy and Physiology in Health and Illness, Churchill Lenigstone, Edinburg. 2. Derasari HR and Gandhi TP (1975) : Elements of Human Anatomy, Physiology and Health Education, M/S. BS Shah Publishers, Ahmedabad. 3. Pearce E (1993) : Anatomy and Physiology for Nurses, Jaypee Brothers, New Delhi. 4. Menaught ANNB and Callander R (1987) : Illustrated Physiology, BI Churchil Living Stone Pvt. Ltd., New Delhi. 5. Chatterijee CC (1987) : Human Physiology, Medical Allied Agency, Calcutta.
Course outcomes (CO)	**CO1 :** Aware about the structure of organs and their functions **CO2 :** Aware about the metabolic process of nutrients **CO3 :** Develop skill of blood and urine tests.

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Introduction to Computer (SC 115)

Course code	**SC 115**
Course title	**Introduction to Computer**
Course credit	**3 (1+2)**
Teaching per week	**5 h**
Course objectives	1. Understand the basic concept of the computer. **2.** Acquaint with computer and its part. 3. Familiar with operating the computer with MS Office.
Course content	**Theory :** 1. Computer : Definition, history, computer system, digital system, analog system.

	2. Block Diagram of computer system : Functions and working of each part in block diagram. 3. Types of computer, working and uses of various input and output devices. 4. Concept, meaning and differences of hardware and software. 5. Operating system : WINDOWS. 6. Directory, folder, importance of file. 7. Introduction to MS Office : World file, worksheet, power point, picture file, photographs. 8. Multimedia : songs, music, recording, presentation etc. 9. Printing. 10. Importance and knowledge about anti-virus. 11. Introduction to Internet and E-mail. **Practical :** 1. Demonstration and working of computer system and peripherals like monitor, key-board, mouse, floppy disks, CD drive, printer etc. 2. Uses of start menu, uses of paste, cut and copy of files. 3. Preparation, editing and printing of file. 4. Preparation of work-sheet, formula and printing. 5. Preparation of power point and its presentation. 6. Preparation of picture, photo file, editing with use of camera, scanner. 7. Use of multimedia. 8. Net-work, E-mail, internet etc.
References :	1. Subramanian N (1989) : Introduction to Computers - Fundamentals of Systems Analysis & Basic Programming, Tata McGraw - Hill Pub. Co. Ltd., New Delhi. 2. Gear CW (1986) : Introduction to Computers, Structured Programming & applications, Module C & P, Galgotia Pub. Pvt. Ltd., New Delhi. 3. Bartee T (1984) : Introduction to Computer Science, McGraw- Hill International Book Company, Singapore. 4. Jagad DM (1990) : Introduction to Computer, Rachana Pub., Bombay.
Course outcomes (CO)	**CO1 :** Understand fundamentals of computer. **CO2 :** Understand the working principle of a computer. **CO3 :** To understand web browsing
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Communication skills I (SC 116)

Course code	**SC 116**
Course title	**Communication skills I**
Course credit	**2 (1+1)**
Teaching per week	**3 h**
Course objectives	1. Understand the English sentence formation. 2. Acquire knowledge regarding English vocabulary. 3. Understand the importance of grammar in the English.
Course content	
References :	

Course outcomes (CO)	**CO1 :** Respond to the listening content **CO2 :** Read and comprehend english texts accutately **CO3 :** Understand sentence structures in English language **CO4 :** Get familiarized with English vocabulary and phrases **CO5 :** Write and speak correctly in formal and informal contexts

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						
CO4						
CO5						

NSS / NCC / Sports

Course code	**-**
Course title	**NSS / NCC / Sports**
Course credit	*****
Teaching per week	*** Non credit course**
Course objectives	1. Understand the community in which they work 2. Understand themselves in relation to their community 3. Identify the needs and problems of the community and involve them in problem solving 4. Develop among themselves a sense of social and civic responsibility 5. Utilise their knowledge in funding practical solutions to individual and community problems 6. Develop competence required for group living and sharing of responsibilities. 7. Gain skills in mobilizing community participation 8. Aquire leadership qualities and democratic attitudes 9. Develop capacity to meet emergencies and natural disasters and practice national integration and social harmony
Course outcomes (CO)	**CO1 :** Improve the quality of educated manpower by fostering social responsibility. **CO2 :** Raising society to a higher material and moral level by preparing students for final dedication in the service of nation. **CO3 :** Introduce urban students to rural life by living in contact with the community in whose mist their institution is located. **CO4 :** Making campus relevant to the needs of the community **CO5 :** Involvement in the tasks of national development **CO6:** Better understanding and appreciation of the problems of the society **CO7 :** Encourage community participation

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						
CO4						
CO5						
CO6						
CO7						

Semester II

Applied Mathematics (121)

Course code	**SC 121**
Course title	**Applied Mathematics**
Course credit	**2 (1+1)**
Teaching per week	**3 h**
Course objectives	1. To provide basic knowledge related to mathematics. 2. Acquaint with principles of mathematics and their application in different food processing and other instruments.
Course content	**Theory :** 1. Algebra : Permutations and Combinations, Value of n_{pr} and n_{Cr} , its properties and simple problems Binomial theorem (without proof) for positive integral index (expansion and general term); Binomial theorem for any index (expansion only) first and second binomial approximation with application to engineering problems Partial fractions (linear factors, repeated linear factors, non reducible quadratic factors) Determinants and Matrices - expansion of determinants (upto third order) using sarrus rule, expansion method and pivotal's condensation method. Properties of determinants, solution of equations (upto 3 unknowns) by Cramer's rule. Definition of matrix, addition, subtraction and multiplication of matrices (upto third order). Inverse of a matrix by adjoint method and elementary row transformations. Solution of equations (up to 3 unknowns) by Matrix method Logarithm: general properties of logarithms, calculations of engineering problems using log tables 2. Trigonometry : Addition and subtraction formulae, product formulae and their application in engineering problems. Transformation from product to sum or difference of two angles or vice versa, multiple and submultiple angles Conditional identities, solution of triangles (excluding ambiguous cases). 3. Vectors : Definition of vector and scalar quantities. Addition and subtraction of vectors. Dot product and cross product of two vectors. Thumb rule. Angle between two vectors, application of dot and cross product in engineering problems, scalar triple product and vector triple product 4. Complex Numbers Definition, Real and Imaginary parts of a complex number, Polar and Cartesian representation of a complex number and conversion from one form to the other, conjugate of a complex number, modulus and argument of a complex number, addition, subtraction, multiplication and division of a complex number. 5. Statistics and Probability Evaluation of standard deviation and process capabilities. Rank, Rank correlation, probability: definition and laws on probability, concept of random variable, probability distribution (Binomial, Poisson and Normal) and their applications. Drawing control charts for average 1X) and range (R) **Practical :** 1. Problems related to theory
References :	1. Applied Mathematics Vol. I by SS Sabharwal and Others by Eagle Prakashan, Jalandhar

	2. Applied Mathematics Vol. II by SS Sabharwal and Others by Eagle, Prakashan, Jalandhar 3. Engineering Mathematics Vol. I by Ishan Publishing House 4. Engineering Mathematics Vol. I by S Kohli and Others; IPH, Jalandhar 5. Engineering Mathematics by Dass Gupta 6. Advanced Engineering Mathematics by AB Mathur and VP Jagi; Khanna, Publishers, Delhi 7. Higher Engineering Mathematics by BS Grewal; Khanna Publishers, Delhi Engineering Mathematics by C Dass Chawla; Asian Publishers, New Delhi
Course outcomes (CO)	**CO1 :** To gain the knowledge of partial differentiation and to solve that applications. **CO2 :** Compute the partial and total derivatives and maxima and minima of multivariable functions **CO3 :** To gain the knowledge of vector and scalar field and learn the application of multi variate calculus.
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Basic Bio-chemistry (SC 122)

Course code	**SC 122**
Course title	**Basic Bio-chemistry**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. Develop an understanding of the principles of biochemistry as applicable to food and human nutrition. 2. Obtain an insight into the chemistry of major nutrients and physiologically important compound. 3. Understand the biological processes and systems as applicable to human nutrition
Course content	**Theory :** 1. Carbohydrates : Introduction, Chemistry of carbohydrates, Classification, structure and properties 2. Protein : Introduction, Chemistry of protein, classification, structure and properties, amino acids – classification, Structure and classification of nucleic acid 3. Lipid : Introduction, Chemistry of lipid, classification, and properties, fatty acids, Neutral fat, phospholipids, Steroids 4. Digestion, Absorption and Transport of Carbohydrates, Proteins and Lipids 5. Vitamins & Minerals: Introduction and Classification vitamins, Introduction and classification of minerals 6. Enzymes: Introduction, Introduction to enzyme, co-enzyme and Iso-enzymes, Nomenclature of and classification of enzymes, mechanism of action, factors affecting enzyme activities 7. Hormones : Endocrine system, Regulation of : Endocrine system, Mechanism of Hormone Action, Biochemical role of Hormone **Pratical :** 1. Introduction to colourimeter. 2. Estimation of pH by pH meter. 3. Estimation of glucose by DNS method.

	4. Qualitative analysis carbohydrates. 5. Estimation of serum cholesterol. 6. Determination of acid value. 7. Determination of saponification value. 8. Estimation of serum protein by biuret method.
References :	1. West ES and Tode WR, Mson HS and Vanbruggen JT (1974) : Textbook of Biochemistry, 4th Edition, Amerind Publishing Co. Pvt. Ltd. 2. White A, Handlar P, Smith EL, Stelten DW (1959) : Principles of Bio-Chemistry, 2nd Edition, McGraw Hill Book Co. 3. Murray RK, Granner DK, Mayer PA and Rodwell VW (1993) : Harper's Bio-Chemistry, 23rd Edition, Lange Medical Book. 4. Lehninger AL, Nelson DL and Cox MM (1993) : Principles of Bio-Chemistry, 2nd Edition, BS Publishers and Distributers. 5. Devlin TM (1986) : Textbook of Bio-Chemistry With Clinical Corrections, 2nd Edition, John Wiley & Sons. 6. Stryer L (1995) : Biochemistry, Freeman WH & Co.
Course outcomes (CO)	**CO1:** Understanding biochemistry of various nutrients and their effect on human body **CO2:** Awareness of chemistry of various biochemicals **CO3:**Knowledge of various biological processes that are continuously going on human body to sustain life
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Communication skills II (SC 123)

Course code	**SC 123**
Course title	**Communication skills II**
Course credit	**2 (1+1)**
Teaching per week	**3 h**
Course objectives	1. Understand the English sentence formation. 2. Acquire knowledge regarding English vocabulary. 3. Understand the importance of grammar in the English.
Course content	
References :	
Course outcomes (CO)	**CO1 :** Respond to the listening content **CO2 :** Read and comprehend english texts accutately **CO3 :** Understand sentence structures in English language **CO4 :** Get familiarized with English vocabulary and phrases **CO5 :** Write and speak correctly in formal and informal contexts
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

	CO4						
	CO5						

Basic Nutrition (ND 121)

Course code	**ND 121**
Course title	**Basic Nutrition**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. To understand the functions of food and the role of various nutrients, their requirements, effect of deficiency and excess. 2. To familiarise students with different methods of cooking, their advantages and disadvantages. 3. To gain knowledge of improving nutritional quality of food.
Course content	**Theory :** 1. Brief history : Historical development of foods and nutrition field. 2. Concept and definition : Nutrition, malnutrition and health, relation of nutrition to health, growth and human welfare. 3. Basic terminologies used in food preparation. 4. Functions of food : Concept of balance diet, basic food groups and their characteristics and contribution to the diet. 5. Minimal nutritional requirements and RDA : Formulation of RDA and dietary guideline. 6. Body composition, measurement and significance, reference man and woman. 7. Methods of cooking, their advantages and disadvantages and effect on nutritive value. 8. Water : Function, requirements, and deficiency. 9. Energy in Human Nutrition : Energy balance assessment of energy requirements, deficiency and excess. **Practical :** 1. Use and care of kitchen equipments. 2. Controlling techniques :Weights and measures - standard and household measures for raw and cooked foods, recipe and evaluation of the product. 3. Food preparation and classifying recipes as good, moderate and poor source of specific nutrients. 4. Amount of ingredients to be used in standard recipe vis-à-vis, portion size : (i) Beverages: Tea, coffee, cocoa, fruit juice, milk and milk shakes. (ii) Cereal and flour mixtures : Basic preparations - boiled rice & rice pulo; chappati, puri, paratha ; chandwiches ; pastas. (iii) Pulses and legumes : Using whole, dehsked and sprouted. (iv) Nuts and oilseeds : Chikki, ladoo. (v) Vegetables : Simple salad, dry vegetables, curries. (vi) Fruits : Fruit preparations using fresh fruits - jam, squash, fruit salad; fruit preparations using dried fruits. (vii) Milk : Porridge – dalia; curd, panneer and their commonly made preparations - butter milk, lassi, shrikhand; milk based simple desserts and puddings - custards, kheer, ice-cream. (viii) Meat – cuts of meet : meat preparations, poultry, fish. (ix) Egg : Hard and soft boiled, poached, scrambled, fried, omelettee, eggnog. (x) Soups : Basic, clear and cream soups.

	(xi) Snacks : Pakoras, cheese toast, upma, pohe.
References :	1. Educational Planning Group (1991) : Food and Nutrition - A Textbook of Home Science for Senior Students, 3rd Edition, Arya Publishing House, New Delhi. 2. Swaminathan M (1983) : Human Nutrition and Diet, 1st Edition, The Banglore Printing and Publishing Co. Ltd. 3. Swaminathan (1977) : Handbook of Foods and Nutrition, 1st Edition, Ganesh & Co. Ltd., Madras. 4. Rajalaksmi R (1978) : Applied Nutrition, 1st Edition. 5. Mudambi SR and Rajgopaln V (1982) : Fundamentals of Foods and Nutrition, 3rd Edition, New Age International Ltd. Publishers.
Course outcomes (CO)	**CO1:** Able to understand basic functions of food and various nutrients, Over nutrition and under nutrition **CO2:** Knowledge of various cooking methods, their advantages and disadvantages. **CO3: C**ompetent to know the basic concepts of planning balanced meal.
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Food Science (FS 121)

Course code	**FS 121**
Course title	**Food Science**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. To understand the major and minor food groups. 2. To know the composition and basic properties of food.
Course content	**Theory** 1. Cereals and millets : Structure, chemical composition, effect of heat and acid, functions of cereals and starch in cookery. 2. Legumes : Structure, chemical composition, storage, effect of heat , acid and alkali; factors affecting cooking of pulses, dals; role of pulses in cooking. 3. Nuts and oil seeds : Difference between nuts and oilseeds, commonly used nuts and oilseeds, structure, composition, role in cookery, effect of heat, acid and alkali. 4. Fats and oils : Types, composition, selection and storage, effect of heat and acid, functions in cookery, rancidity in fats. 5. Fruits and vegetables : Types, composition, availability, selection and purchase, storage, pigments, flavour components, change caused by the heat, acid and alkali. 6. Milk and milk products : Composition, classification, storage, spoilage, use, cost, role of milk products in cooking. 7. Egg : Structure, composition, grading of egg, selection and storage, spoilage, functions and changes during cooking. 8. Meat, poultry and fish : Kind, structure, composition, Selection and purchase, storage, use, cost, spoilage, pigments, factor effecting tenderness, post-mortem changes during cooking. 9. Sugars : Types, composition, manufacturing process, selection, storage and use, effect of heat and acid, functions in cookery.

	10. Condiments and spices : Types and use, importance in daily life. **Practical :** 1. Cereal: Preparations showing dextrinization and gelatinization, functions of starch in cereals, gluten formation and factors affecting it, identification of the food grains. 2. Legumes, nuts and oils seeds: Ways of using – sprouting, fermentation and roasting. 3. Fruits and vegetable: Effect of temperature and pH. 4. Use of oils and fats in food eg. Frying, garnishing, seasoning. 5. Milk and milk products : Effect of heat, acid, alkali and enzymes - coagulation, fermentation by lactic acid, uses of milk and milk products in various preparations. 6. Egg: Preparations showing functions of egg (i.e. coagulation), various ways of using egg - thickening agent, emulsifying agent, coating agent, leavening agent. 7. Meat: Preparations involving various methods of cooking. 8. Sugars : Preparations showing functions of sugar in cookery - caramelization, milliard reaction, syrup.
References :	1. Paul PC and Palmer HH (1972) : Food Theory and Applications, Wiley, New York. 2. Pyke Mangus (1970) : Food Science & Technology, Food & Nutrition Press, 3rd., Connecticut.
Course outcomes (CO)	**CO1 :** Able to apply basic concepts of food groups in planning of recipes. **CO2 :** To plan and prepare different types of recipes based on food group properties. **CO3 :** Capable to know the basic principles and properties of food materials.
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Food Microbiology (FS 122)

Course code	**FS 122**
Course title	**Food Microbiology**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. To acquire knowledge regarding microorganisms. 2. To understand the importance of microorganisms and spoilage caused by them. 3. To understand the principles of various methods used in the prevention of microorganism in foods.
Course content	**Theory** 1. Cell structure of microorganisms, classification in brief. 2. Cultivation of microorganisms : Nutritional requirements, types of media, methods of isolation. 3. Brief history and introduction to important microorganisms in foods : Food pathogens and spoilage organisms. 4. Different sources of contamination and intrinsic and extrinsic parameters of foods which affect microbial growth and survival, general principles underlying food spoilage, chemical changes caused by microorganisms. 5. Spoilage changes in different foodstuff in brief.

	6. Food hazards : Food borne infections, food intoxication (poisoning), symptoms and methods of prevention and control. **Practical :** 1. Demonstration of different parts of the microscope, their use and care of the microscope including oil immersion lens. 2. Microscopic examination of microbial cells. 3. Preparation of bacterial smears, simple staining and differential staining. 4. Preparation of common laboratory media for cultivation of bacteria, yeast and mould. 5. Isolation of bacteria by pour plate method (dilution), spread plate method and streak plate method. 6. Microbiological analysis of tap water, well water, pound and river water and testing efficiency of various water treatments. 7. Bacteriological examination of milk, cereals, flour and bread, sugar, spices, egg, meat and pickles. 8. Bacteriological examination of equipments used in the food preparation and services and in nail parings. 9. Standard plate count and coliform count for all of the above.
References :	1. Frazier WC and Westhoff DC (1988) : Food Microbiology, 4th Edition, McGraw Hill Publisher. 2. Jay James M (1986) : Modern Food Microbiology, 3rd Edition, Van Nostrand Reinhold Co., Inc. 3. Collins CH and Layne PM (1996) : Microbiological Methods, Buttersworth, London.
Course outcomes (CO)	**CO1 :** Understand the significance of microbes associated to food and food products. **CO2 :** Understand about the various types of microbes associated with food spoilage and pathogenesis. **CO3 :** Understand and identify the role of microbes in food preservation. **CO4 :** Comprehend the various techniques for isolation and characterization of microbes. **CO5 :** Apply the learnt techniques to detect the pathogens associated with the foods to ensure food safety and quality.
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						
CO4						
CO5						

NSS / NCC / Sports

Course code	**-**
Course title	**NSS / NCC / Sports**
Course credit	*****
Teaching per week	*** Non credit course**

<table>
<tr><td>Course objectives</td><td>1. Understand the community in which they work
2. Understand themselves in relation to their community
3. Identify the needs and problems of the community and involve them in problem solving
4. Develop among themselves a sense of social and civic responsibility
5. Utilise their knowledge in funding practical solutions to individual and community problems
6. Develop competence required for group living and sharing of responsibilities.
7. Gain skills in mobilizing community participation
8. Aquire leadership qualities and democratic attitudes
9. Develop capacity to meet emergencies and natural disasters and practice national integration and social harmony</td></tr>
<tr><td>Course outcomes (CO)</td><td>CO1 : Improve the quality of educated manpower by fostering social responsibility.
CO2 : Raising society to a higher material and moral level by preparing students for final dedication in the service of nation.
CO3 : Introduce urban students to rural life by living in contact with the community in whose mist their institution is located.
CO4 : Making campus relevant to the needs of the community
CO5 : Involvement in the tasks of national development
CO6: Better understanding and appreciation of the problems of the society
CO7 : Encourage community participation</td></tr>
<tr><td>Mapping between COs and PSOs</td><td>
<table>
<tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td><td>PSO6</td></tr>
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<tr><td>CO5</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO6</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO7</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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Semester III

Health, Hygiene and Sanitation (ND 211)

Course code	**ND 211**
Course title	**Health, Hygiene and Sanitation**
Course credit	**2 (1+1)**
Teaching per week	**3 h**
Course objectives	1. Develop correct habits of personal and environmental hygiene. 2. Learn safe handling of food and ensure complete safety of raw and processed foods.
Course content	**Theory :** 1. Concept, significance and interrelationship of hygiene, sanitation and cleanliness : Their application to everyday life. 2. Personal hygiene: Care of hands, head, hair, skin, hands, feet, teeth, use of cosmetics and jewellery, good health characteristics, cultivation of hygienic habits to promote health, factor effecting the personal health. 3. Safe handling of food : Personal hygiene including uniform, medical check up, good food handling habits & practices and training & awareness, care while working or handling food. 4. Care of premises and surroundings and equipments : Floors and walls, table tops, floors etc.; good ventilation and lighting, care of dark corners, crevices and cracks; garbage disposal - collection storage and proper disposal from the premises including effluents. 5. Care for equipments and machinery. 6. Care of receipt, storage, transportation, and selling : Storage of food - technique of correct storage, temperatures of different commodities to prevent bacterial contamination of milk, butter, cream, cheese, fruit juices. 7. Control and eradication of flies, cockroaches, rodents and other pests – fumigation technique. 8. Notification, quarantine, segregation, disinfections : Definition of disinfectant, sanitation, antiseptic and germicides; common disinfectants use in case of working surfaces, plant, equipments; dish washing, hand washing etc. and sterilization of plant equipments. 9. Legal administration and quality control : Laws relating to food hygiene, municipal health services. **Practical :** 1. Safe handling of food 2. Cleaning of Floors and walls, table tops, floors etc., garbage disposal - collection storage and proper disposal from the premises including effluents. 3. Cleaning of equipments and machinery. 4. Technique of correct storage, temperatures of different commodities. 5. Control and eradication of flies, cockroaches, rodents and other pests.
References :	1. Hobbs BC and Gilbert (1970) : Food Poisoning and Food Hygiene, Edward Arnold, London. 2. Rack BG : Hygiene in Food Manufacturing and Handling, Food Trade Press, London. 3. Longree K and Blaker GG (1971) : Sanitary Techniques in Food Service, John Wiley, New York. 4. Longree K (1967) : Quality Food Sanitation, 2nd Edition, Inter Science Pub., John Wiley & Sons, New York

Course outcomes (CO)	**CO1:** Aware regarding importance of personal and environmental hygiene **CO2:** Able to handle raw and processed food with highest level of safety **CO3:** Familiar with various techniques of maintaining overall hygienic surroundings

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Human Nutrition (ND 212)

Course code	**ND 212**
Course title	**Human Nutrition**
Course credit	**4 (2+2)**
Teaching per week	**6 h**
Course objectives	1. To familiarize with different aspects of nutrients. 2. To understand the role of various nutrients, their requirements, effect of deficiency and excess. 3. To gain knowledge of improving nutritional quality of food.
Course content	**Theory :** 1. Protein : Classification, functions, sources, requirement - factors affecting, factors affection on digestion and absorption, effect of excess and deficient intake, factors affecting protein availability. 2. Carbohydrate : Classification, functions, sources, requirement - factors affecting on digestion and absorption, effect of excess and deficient intake, blood glucose and effect of different carbohydrates on blood glucose, glycemic index. 3. Fat : Classification, functions, sources, requirement - factors affecting on digestion and absorption, effect of excess and deficient intake, types of fatty acids, role and nutritional significance of SFA, MUFA, PUFA. 4. Minerals : Classification, functions, sources, requirement - factors affecting on digestion and absorption, effect of excess and deficient intake of the minerals and trace elements, physiological role of minerals, bio-availability. 5. Vitamins : Classification, Functions, sources, requirement - factors affecting on digestion and absorption, effect of excess and deficient intake of the various Vitamins, physiological role of vitamins, bio-availability. 6. Improving nutritional quality of foods : Germination, fermentation, supplementation, substitution, fortification and enrichment. **Practical :** 1. Planning, preparation and calculation of recipes rich in the specific nutrients. 2. Classifying recipes as good, moderate and poor source of specific nutrients.
References :	1. Educational Planning Group (1991) : Food and Nutrition - A Textbook of Home Science for Senior Students, 3rd Edition, Arya Publishing House, New Delhi 2. Swaminathan M (1983) : Human Nutrition and Diet, 1st Edition, The Banglore Printing and Publishing Co. Ltd. 3. Swaminathan M (1977) : Handbook of Foods and Nutrition, 1st Edition, Ganesh & Co. Ltd., Madras. 4. Rajalaksmi R (1978) : Applied Nutrition, 1st Edition. 5. Mudambi SR and Rajgopaln V (1982): Fundamentals of Foods and Nutrition,

	3rdEdition, New Age International Ltd. Publishers.
Course outcomes (CO)	**CO1:** Understanding the classification, functions, sources and requirement of nutrients for human being **CO2:** Understanding the digestion and absorption of nutrients **CO3:** Can plan the nutritional recipes and calculate the nutrient contents of recipes
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Meal Planning (ND 213)

Course code	**ND 213**
Course title	**Meal Planning**
Course credit	**3 (1+2)**
Teaching per week	**5 h**
Course objectives	1. To familiarize the students with planning of balanced meals and factors affecting meal Planning. 2. To sensitize the students to difference in dietary requirements and nutritional needs through the different stages of the life span. 3. To equip the students with skills to plan balanced meal.
Course content	1. Importance of meal planning and factors to be considered while planning meals. 2. Use of food groups and exchange list in planning meals for a normal adult, calorie consumption unit in planning meals for a family. 3. Meal Planning through the various stages of life span **-** dietary goals related to physiological changes be given. 4. Meal planning, calculations; comparison with RDA. 5. Planning menus according to meal timing viz. breakfast, lunch, snacks, dinner and contribution of each meal to the RDA. **Practical :** 1. Planning and preparation of diets for different age groups : Infancy, preschool age, school age, adolescent, adult, old age. 2. Planning and preparation of diets for special conditions : Pregnancy and lactation. 3. Planning and preparation of diets for special occasions : Birthdays, festivals, packed lunches etc.
References :	1. Srilakshmi B (2000) : Dietetics, 3rd Edition, New Age International Ltd. Publishers. 2. Barber, Mitchell, Rynbergen (1963) : Nutrition in Health and Diseases, 14th Edition, JB Lippincott Co. 3. Fonoscb and Kvitka (1978) : Meal Management - Concept and Application, Harpor and Raw Publisher. 4. Holman SR (1987) : Essential of Nutrition, JB Lippincott Co. 5. Kinder F (1968) : Meal Management, 3rd Edition, McMillan Co. Ltd. 6. Mudamb SR and Rajgopal MV (1982) : Fundamentals of Foods and Nutrition, 3rd Edition, New Age International Ltd. Publishers.

	7. Robinson : Normal and Therapeutic Nutrition, 16th Edition. 8. Suitor CW and Crowley MF (1984): Nutrition - Principles and Application in Health Promotion, 2nd Edition, JB Lippincott Co.
Course outcomes (CO)	**CO1:** Knowledge of nutritional requirements during various stages of life and understanding concepts of meal planning **CO2:** Able to plan balance meals for healthy personals of various age groups **CO3:** Calculating nutritional values of planned meal and modifications in same

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Food Chemistry (FS 211)

Course code	**FS 211**
Course title	**Food Chemistry**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. To understand the chemistry of food and food system. 2. Theoretical aspects in increasing food quality.
Course content	1. Introduction to food chemistry. 2. Physical functions of food : Solid and amorphous foods, liquids and role in food products, gases and role in food products, true solutions, dispersions and suspensions, sols, gels, foams and emulsions. 3. Moisture in foods : Hydrogen bond, bound water, water activity & food stability. 4. Carbohydrates : Characteristics and properties of mono, oligo and polysaccharides and their use in foods; chemical reactions in food – hydrolysis, thermal degradation, dehydration, caremalization, malliard reaction and their applications in food industries; other sweetening agents; changes on cooking and processing. 5. Amino acids, peptides and proteins : Physical, chemical and functional properties - hydration, solubility, viscosity, gelation, texturization, emulsification, binding, foaming, malliard reaction and browning, crystallization, denaturarion. 6. Lipid : Physical and chemical aspects, emulsion and emulsifiers, chemistry of fat and oil processing, role of fat and application in food preparation, shortening – shortening value and factors affecting on it, fat stabilizers, changes occur in fat during processing, cooking and storage, deterioration of fats / oils – rancidity, reversion and polymerization, role of food lipids in flavour. 7. Pigments in food : Structure, chemical and physical properties, effect of processing and storage, naturally occurring pigments, enzymatic browning in fruits and vegetables. **Practical :** 1. Starch cookery : Preparation of starch from potatoes; microscopic examination of starch; effect of blending on the distribution of starch granules in suspension; gelatinization of starch and thickening abilities – effect by type and concentration of starch, extent of heating, agitation, effect of ingredients like fat, acid, sugar, protein etc. 2. Effect of acid & alkali on cooking of cereals & pulses; acid coagulation of milk.

	3. To determine gluten content of different flours. 4. To study the effect of different methods of storage on the quality of eggs. Uses of eggs in cookery as leavening agent, emulsifying agent, binding agent, coating etc. 5. To study the different types of browning reactions. 6. To study the smoking point of different types of fats; to study the effect of low and high temperature on the quality of food products; to observe the effect of addition of shortening on the food product; to study the different methods of storage of various fats.
References :	1. Lillian Hoagt and Meyer (1987) : Food Chemistry, CBS Publishers & Distributors. 2. Shakuntala Manay (2000) : Food Facts & Principle, Wiley Eastern Co., New Delhi. 3. Srilakshmi (2001) : Food Science, 4th Edition, New Age International Pvt. Ltd. 4. Swaminathan M (1984) : Food Science, Chemistry and Experimental Foods : Bappco Ganesh and Co., Madras.
Course outcomes (CO)	**CO1 :** Role of vitamins and minerals is well understood. **CO2 :** Knowledge gained about taste and flavor perception and their causatives. **CO3 :** Familiarization about natural and synthetic food colorants used in food **CO4 :** Utility of use of enzyme in food processing is elucidated along with knowledge of anti-nutritional factors.
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						
CO4						

Food Production and Patisserie I (FS 212)

Course code	**FS 212**
Course title	**Food Production and Patisserie I**
Course credit	**3 (1+2)**
Teaching per week	**5 h**
Course objectives	1. To acquaint students with national, international, traditional cuisines. 2. To develop skill of food production.
Course content	**Theory :** 1. Introduction to cookery-Aims objectives of cooking food, methods of cooking food, types of cooking fuel. 2. Food preparation techniques-Characteristics of raw materials, flavourings, seasonings, masalas, spices & herbs used in food preparation (Indian and continental). 3. Preparation of stock and soups, Preparation of vegetables, egg preparation, sandwich and pasta preparation, Sauce- mother sauce with recipes, cooking of fish, rice, pulse, meat, chicken and pasta. 4. Indian cookery-Regional cooking styles: Punjab-characteristics, ingredients and equipment used, recipe of popular dish. Bengal-characteristics, ingredients and equipment used, recipe of popular dish. Goa- characteristics, ingredients and equipment used, recipe of popular dish. Kerala- characteristics, ingredients and equipment used, recipe of popular dish. Tamilnadu- characteristics, ingredients and equipment used, recipe of popular dish. Chinese cuisine- Regional styles, characteristics, ingredients and equipment used, recipe of popular dish.

<table>
<tr><td></td><td>5. Kitchen Management - Hierarchy, layout, kitchen equipments, portion budgetary control and forecasting.
Practical :
1. Laboratory rules, abbreviations and conversations.
2. Introduction to equipments needed in various cooking procedures.
3. Introduction to pre-preparations of food items for cooking : Cutting, chopping, blending, grating, whipping etc.
4. Preparation of various dishes using different methods of cooking.
5. Preparation of various recipes of traditional cuisines.
6. Preparation of modern recipes.
7. Preparation of national cuisines : Northern region, southern region, western region, eastern region.
8. Preparation of international cuisine : Oriental cuisine – Chinese, Japans, Thai, Turkish, Arabic etc.; Continental cuisine – British, Germen, French, Spanish, Italian; South American cuisine – Maxican.</td></tr>
<tr><td>References :</td><td>1. Tarla Dalal’s Books on Preparations of Various Recipes.</td></tr>
<tr><td>Course outcomes (CO)</td><td>CO1: Capable in using various cooking methods to develop national and international cuisines
CO2: Capable of using various cooking apparatus effectively while preparing national and international dishes
CO3: Able to develop and designing new food product</td></tr>
<tr><td>Mapping between COs and PSOs</td><td>
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<tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td><td>PSO6</td></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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Food Preservation and Storage (FS 213)

Course code	**FS 213**
Course title	**Food Preservation and Storage**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. To acquire knowledge regarding principles & methods of preserving foods. 2. To develop ability in preparing and preserving various foods by household methods. 3. To acquire knowledge and develop ability for storage of food material.
Course content	**Theory :** 1. Introduction to food preservation, principles, techniques used and its importance. 2. Principles involved in preserving foods by different methods. 3. Different types of packaging material : Food contact material - Metal, wood, glass, paper, plastic etc. - characteristics in detail, surface finish of material (smoothness, roughness etc.), sanitary standards and designs, contact of packaging material with food and their effect in brief. 4. Food additives : Role of various types of food additives, food dispersions; food sols, food gels, food emulsion and foams in foods. 5. Food preservatives : Mechanism of their use, doses, legal aspects etc. 6. Selection and purchase of foods for preservation.

7. Processing methods for food preservation :
   (i) Canning and bottling - steps involved, principle of processing, acid and non-acid foods; types of containers used, types of lacquers, spoilage of canned foods.
   (ii) Preservation by use of low temperature - principles involved, types of low temperature storage, types of freezing, changes during freezing & thawing, types of containers used.
   (iii) Drying and dehydration -principal involved, methods of drying & dehydration, different types of driers, freeze drying, packing & storage.
8. Storage of common perishable and non-perishable foods.

Practical :

1. Market survey of raw and preserved foods.
2. Preparation of various food product for preservation : Fruit juice, squash and cordial; jam, jelly and marmalades - comparison / difference; pickles, ketchup and chutney, dehydrated product.
3. Preparation of items utilizing cereal and legume flours and their storage.
4. Preparation of instant mixes - *Upma / Dhokla / Vadas*.
5. Processing methods for food preservation : Bottling of pineapple peas, freezing of fruits / vegetables, drying of vegetables (solar, sun and oven), reconstitution of dried vegetables.

References :

1. Girdharilal (1967) : Preservation of Fruits and Vegetables, ICAR, New Delhi.
2. Desrosser NW and Desrosser JN (1917) : The Technology of Food Preservation. AVI Publications Co., Connecticut.
3. Srilakhsmi B (2000) : Food Science, New Age International Pvt. Ltd. Publishers.

Course outcomes (CO)

CO1: Aquaint the knowledge about food preservation techniques.
CO2: Gain knowledge about food additives.
CO3: Utilize food additives for new product development

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Semester IV

Diet Therapy (ND 221)

Course code	**ND 221**
Course title	**Diet Therapy**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. Understand the role of diet in the therapy. 2. Gain knowledge on dietary modifications for common diseases. 3. Acquire ability to plan and prepare diets for common diseases.
Course content	**Theory :** 1. Basic concepts : Diet therapy, dietician, dietetics and therapeutic diets. 2. Role of dietician in the hospital and community. 3. Therapeutic adaptations of normal diet, progressive diets, liquid, soft and regular diets. 4. Modification of normal diet : Clear liquid, full liquid, soft diet. 5. Diet in relation to fever conditions and infections. 6. Energy modification and nutritional care in weight management : (i) Diet in over weight - factors leading to overweight. (ii) Diet in under weight – anorexia nervosa, bulimia. 7. Causes, symptoms and dietary treatments of common gastro intestinal disturbances : Constipation, diarrhoea, peptic ulcer, ulcerative colitis. **Practical :** 1. Planning and preparation of clear liquid, full liquid, semisolid and soft diet. 2. Planning and preparation of diets for fever, typhoid, tuberculosis patients. 3. Planning and preparation of diets for underweight and overweight conditions. 4. Planning and preparation of diets for constipation, diarrhoea, peptic ulcer and ulcerative colitis.
References :	1. Anderson L, Dibble MU, Turkki PR, Mitchall HS and Rynbergir HJ (1982) : Nutrition in Health and Diseases, 17th Edition, JB Lippincott & Co., Philaderphia. 2. Antia FP (1973) : Clinical Dietetics and Nutrition, 2nd Edition, Oxford University Press, New Delhi. 3. Mahan LK, Arlin MT (1992) : Krause's Food Nutrition and Diet Therapy, 8th Edition, WB Sunders Co., London. 4. Robinson CH, Lawler MR, Chenoweth WI and Garwick AE (1986) : Mormaland Therapeutic Nutrition, 17th Edition, McMillan Publishing Co. 5. Willims SR (1986) : Nutrition and Diet Therapy, 6th Edition, Tures Mirroe, Mabsi College Publication, St. Louis. 6. Raheenabegum (1989) : A Text Book of Food, Nutrition and Dietetics, Sterling Publishers, New Delhi. 7. Joshi SA (1992) : Nutrition and Dietetics, Tata McGraw Hill Publications, New Delhi.
Course outcomes (CO)	**CO1:** To understand the diet therapy concept and dietitian role in hospital **CO2 :** To aware about the acute diseases **CO3:** To plan and prepare the therapeutic diet for acute disease
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Maternal and Child Nutrition (ND 222)

Course code	**ND 222**
Course title	**Maternal and Child Nutrition**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. Understand the physiology of pregnancy and lactation and how these influence nutritional requirements. 2. Learn benefits of breast feeding. 3. Be aware of problem encountered in pregnancy and during breast feeding. 4. Understand the process of growth and development from birth until adulthood. 5. Get familiar with nutritional needs at different stages of growth. 6. Understand the concept of growth promotion.
Course content	**Theory :** 1. Physiology of pregnancy, factors (non nutritional) affecting pregnancy outcome, importance of adequate weight gain during pregnancy and antenatal care and its schedule, late effects of feral malnutrition. 2. Nutritional requirements during pregnancy and modification of existing diet and supplementation, nutritional factors affecting breast feeding, deficiency of nutrients and impact – energy, ion, folic acid, protein, calcium, iodine; common problems of pregnancy and their management – nausea, vomiting, pica, pregnancy induced hypertension, obesity, diabetes, adolescent pregnancy – consequences, care. 3. Nutritional requirement during lactation and dietary management, food supplements, preparation for lactation, care and preparation of nipples during lactation, breast hygiene. 4. Infant physiology relevant to feeding and care : Breast feeding, colostrum – its composition and importance in feeding, introduction of breast feeding and duration of breast feeding, nutritional and other advantages of barest feeding. 5. Standardization of complementary food, initiation and management of weaning food breast feeding etc., mixed feeding – breast feeding and artificial feeding, teething and management problems. 6. Characteristics and feeding of toddlers, preschool, school going children and adolescent; management of preschool and low birth weight children, feeding children with special needs, dietary management of children with inborn errors of metabolism (PKU, glycogen storage diseases, wilson's diseases), malabsorption (lactose intolerance, celiac disease), food allergies. 7. Somatic, physical, brain and mental development, puberty, pre-pubertal and pubertal changes, importance of nutrition for ensuring adequate growth and development. **Practical :** 1. Assessment of existing diets of pregnant and lactating women and its improvement. 2. Planning of dietary schedule for infants, 6-12 months. 3. Planning and preparation of nutridense, complementary foods for infants, 6-12 months. 4. Preparation of nutritional snack for preschool children. 5. Preparation of packed lunch for primary school age and adolescent. 6. Planning and preparation of food for specific condition i.e. Lactose intolerance, Celiac disease, Amylase Rich Food (ARF)

References :	1. Gihosh S (1992) : The Feeding and Care of Infant and Young Children, 6th Edition, UHAI, New Delhi. 2. WHO (1978) : A Growth Chart of International Use in Maternal and Child Health Care, WHO, Geneva. 3. Swaminathan M (1985): Essential of Foods and Nutrition, Ganesh & Co., Bangalore.
Course outcomes (CO)	**CO1:** To understand the process of growth and development from birth to adulthood **CO2:** To aware with nutritional needs at different stages of growth

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						

Community Nutrition (ND 223)

Course code	**ND 223**
Course title	**Community Nutrition**
Course credit	**2 (1+1)**
Teaching per week	**3 h**
Course objectives	1. To sensitize the students to the concept of health from the individual and community perspective. 2. To familiarise the students with measures taken by the government to improve the nutritional status of the community. 3. To enable the students to use growth charts for nutritional assessments. 4. To understand the concept of health from the individual and community perspective. 5. To asses health and nutritional status and analysis situation. 6. To know factors affecting health and nutritional status of individual and community.
Course content	**Theory :** 1. Concept of community nutrition : Relevance of community nutrition for a developing country like India. 2. Nutritional problems of the community : Important nutritional disorders in India – etiology, symptoms, consequences, treatment and preventive measures for protein calorie malnutrition, iron and folicacid deficiency anemia, vitamin-A deficiency, iodine deficiency, flourosis. 3. National nutrition programmes : ICDS, MDM, National nutritional anemia prophylaxis programme, national iodine deficiency disorder prophylaxis programme, national nutrition policy. 4. National intervention for the vulnerable group : (i) Identification of the at risk group – infants and mothers. (ii) Importance of mothers milk - bottle v/s breast feeding – an overview. (iii) Importance of complementary food – planning of complementary foods and other supplementary foods for infant 0-6 months, above 6 months and mothers, use of premixes for supplementary feeding programme. (iv) Use of growth charts for nutritional assessments. 5. Nutrition and infection : Relationships with appropriate examples, immunization and its importance.

	6. Lifestyle and nutritional disorders : Obesity, diabetes mellitus, hypertension, cancer, AIDS, alcoholism, lack of exercise. 7. Health hazards resulting from : Intestinal adulteration, incidental adulteration – metallic contamination, bacterial and fungal contamination, pest and pesticides residues, processing and packaging hazards. **Practical :** 1. Development of nutritional health education materials like charts, posters, puppets etc. for the mother and school children. 2. Preparation of the scripts either role play / puppet show for nutrition health education. 3. Use of nutrition health education tools in the field of school, anganwadi, mahila mandal.
References :	1. King MH : Nutrition for Developing Countries. 2. McWilliams M : Nutrition for Growing Years. 3. Gopaldas T and Sheshadri S : Nutrition Monitoring and Assessment. 4. Ghosh S : Feeding and Care of Infants and Young Children. 5. Robinson C : Normal and Therapeutic Nutrition. 6. Park JE and Park K : Text Book of Preventive and Social Medicine.
Course outcomes (CO)	**CO1:** Understanding basics of community nutrition related problems in India **CO2:** Awareness regarding health and nutritional status and its analysis. **CO3:** Knowledge of various factors that affect health of community

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Public Health and Epidemiology (ND 224)

Course code	**ND 224**
Course title	**Public Health and Epidemiology**
Course credit	**2 (1+1)**
Teaching per week	**3 h**
Course objectives	1. To understand the concept of public nutrition and epidemiology. 2. To know the importance of epidemiology and demography in health. 3. To asses health and nutritional status and analysis situation. 4. To know factors affecting health and nutritional status of individual and community.
Course content	**Theory :** 1. Health and dimensions of health, positive health versus absence of disease. 2. Community and its organization, concept of community, types of community. 3. Epidemiology : study of the epidemiologic approach - time distribution, place - person determinants of disease, preventive and social means, community health through life span, vital statistics and their significance. 4. Epidemiological methods - descriptive, analytical, experimental, serological, clinical. 5. Community food protection : Epidemiology of food borne diseases, modes of

transmission, control measures and prevention; food protection and safety, vector control and rodent control.

6. Factors affecting food consumptions and nutritional status of community :
   (i) Agricultural production, storage and distribution, socio cultural factors, economic factors, population, science and technology; food toxins other related factors.
   (ii) Sociological factors in etiology and prevention of malnutrition - food production and availability, cultural influences, socio economic factors, food consumption, conditioning infections, psychosocial, emergency / disaster conditions eg. famine, floods.
7. Programme planning, diagnosis of the situation, setting of the objectives, suitability and relative cost of various solutions; implementation and evaluation.
8. National programme and policies regarding food production, distribution and role of national and international agencies in implementing these programmes.

Practical :

1. Survey of local food practices and food availability.
2. Visit to the ongoing public health nutrition programme.
3. Developing and implementation of nutrition and health education programme for the community.

References :

1. Gupta MD(1996):Health, Poverty and Development in India, Oxford University Press, Delhi.
2. Akhtar R (1990): Environmental Pollution and Health Problems, Ashish, New Delhi.
3. England Dept. of Edu. & Sci. (1968) : Handbook of Health Education, HMSO, London.
4. Jaysuriya DC (1997) : Health Law; International and Regional Perspectives, Har Anand Pub. Pvt. Ltd., New Delhi.

Course outcomes (CO)

CO1: Understanding basics of public health and nutrition related problems in India
CO2: Awareness regarding various government projects of nutrition
CO3: Knowledge of various factors that affect health of community

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Food Analysis and Quality Assurance (FS 221)

Course code	**FS 221**
Course title	**Food Analysis and Quality Assurance**
Course credit	**3 (1+2)**
Teaching per week	**5 h**
Course objectives	1. To acquaint students with various methods of food analysis. 2. To make the students aware regarding analytical techniques used for food products. 3. To understand the role of food standard in expanding food preparation activities. 4. To be able to use sensory evaluation as an analytical tool

<table>
<tr><td>Course content</td><td>Theory :
1. Principles involved in physical, chemical and microbiological methods of analysis.
2. Importance of quality control and assurance, food laws and regulations, sampling procedure.
3. Application of food standards and their specifications for raw foods and food products for its constituents and additives.
4. Categories of food quality : Sensory (colour and appearance, texture, flavour), compositional, nutritional and health qualities of foods, quality standards for food. International and national standards Codex alimentary, ISO-9000, WHO, BIS, AGMARK, FPO, HACCP etc.
Practical :
1. Analysis of basic food constituents eg. Carbohydrate, protein, fat, ash etc.
2. Visit to quality control laboratory and food processing industries.</td></tr>
<tr><td>References :</td><td>1. AACC (1995) : Approved methods of AACC, 9th Edition, American Association of Cereal Chemist.
2. AOAC (1984) : Official Methods of Analysis, 14th Edition, Association of official Analytical Chemists, Washington DC.
3. Hobbs BC and Gilbert (1970) : Food Poisoning and Food Hygiene, Edward Arnold, London.
4. Rack BG : Hygiene in Food Manufacturing and Handling Food, Trade Press, London.
5. Longree K and Blaker GG (1971) : Sanitary Techniques in Food Service, John Wiley & Sons, New York.
6. Longree K (1967) : Quality Food Sanitation, 2nd Edition, Inter Science Pub., John Wiley & Sons, New York.</td></tr>
<tr><td>Course outcomes (CO)</td><td>CO1: Understanding basic concepts of food analysis and quality assurance
CO2: Knowledge of analysis techniques to evaluate basic food components
CO3: Capacity to carry out sensory evaluation of various food products</td></tr>
<tr><td>Mapping between COs and PSOs</td><td>
<table>
<tr><th></th><th>PSO1</th><th>PSO2</th><th>PSO3</th><th>PSO4</th><th>PSO5</th><th>PSO6</th></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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Food Formulation (FS 222)

Course code	**FS 222**
Course title	**Food Formulation**
Course credit	**2 (1+1)**
Teaching per week	**3 h**
Course objectives	1. To understand the process of development of food product. 2. To acquire knowledge to develop nutritious, cost effective and marketable new food products.
Course content	**Theory :** 1. Food needs and consumer preferences : Needs and types of food consumption trends; economic, psychological, anthropological and sociological dimensions of food consumption. 2. Trends in social change and its role in diet pattern : Consumer research and the

	market identification for the need of new products. 3. Developing standard products - Types of product and logistics, primary and secondary, various food ingredients used, use of additives. 4. Designing new products using need based perspective and application in various situations. **Practical :** 1. Need for new products : Identifying areas, subgroups/programmes where new food products are required or can be useful through market survey. 2. Listing variety of possible food products : Establishing selection criteria and target group selecting a food product for development. 3. Planning for food product to be developed : Processing steps, ingredients required, equipments required, standardization, evaluation, large scale preparation, packaging and shelf life studies, drawing up a working plan and time schedule. 4. Visit to commercial food manufacturing, packaging as well as R&D units.
References :	1. Rapheal H Jand Olson DL (1976) : Package Production Management, 2nd Edition, AVI Pub., Connecticut. 2. Bendor FE, Kramer A and Kahn G (1976) :Systems Analysis for the Food Industry, AVI Pub. Co., Connecticut. 3. Potty VH and Mulky MJ (1983) : Food Processing, Oxford & IBH Pub. Co Pvt. Ltd., 4. Darrah LB (1971) : Food Marketing, The Ronald Press Co. 5. Bedekar SJ (1991) : Marketing Concepts and Strategies, Oxford University Press.
Course outcomes (CO)	**CO1:** Understand the need and process of new food product development **CO2:** Develop and design new food products **CO3:** Understand the equipment's and processing techniques application in new food product development
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Food Production and Patisserie II (FS 223)

Course code	**FS 223**
Course title	**Food Production and Patisserie II**
Course credit	**3 (1+2)**
Teaching per week	**5 h**
Course objectives	1. Know the raw materials used in bakery product preparation. 2. Understand the processing of bakery products. 3. Familiarise with problems arise and its possible solution in bakery products.
Course content	**Theory** 1. Bakery ingredients : Flour – wheat and its milling, grades, properties; yeast - functions, types, qualitative estimation, storage, quantity used; salt - functions,

effect on fermentation, quantity; water - functions, types and its effect on fermentation and corrective measures, improvers and preservatives.

2. Steps in bread processing. And bread making methods : Conventional and mechanical dough development methods.
3. Bread characteristics : Internal and external characteristics – sign of good characteristics and how to attain it, problems in achieving good characteristics and its remedies. Bread faults : Internal and external faults – causes and preventive measures.
4. Bread diseases : Rope, moulds, food poisoning and bleeding bread – types, causes, preventive measures. Staleness in bread : Definition, characteristics of stale bread, types - crust staling and crumb staling, causes and retardation.
5. Other fermented products : Specific raw material and processing - bun goods, pizza base / crust, doughnut etc.
6. Cake formula and processing : Types of formula, various methods of mixing, panning, baking.
7. Cake characteristics : Internal and external characteristics – sign of good characteristics and how to attain it, problems in achieving good characteristics and its remedies, points for preparing good quality cake. Cake faults : Internal and external faults – causes and preventive measures.
8. Cookies and Crackers : Raw materials and processing.

Practical :

1. Simple, rich and specific bread preparation.
2. Processing of variety toast, bun and dinner rolls.
3. Preparation of Basic sweet dough and its products.
4. Manufacturing of pitza, stuffed products and other fermented bakery products at laboratory scale.
5. Processing of various types of biscuits and cookies.
6. Preparation of different types of cakes.
7. Preparation of cake pastry, cake rusk / sliced cake.
8. Different types of icing, tart, pies.

References :

1. Kamaliya MK and Kamaliya KB (2001) :Baking : Science and Industries, Kamaliya MK, Anand.
2. Dubey SC (2002) : Basic Baking Science and Art, Dubey SC, New Delhi.
3. Pyler EJ (2000) :Baking Science and Technology, Sosland Publishing Co., Kansas, USA.
4. Matz SA (1996) :Ingredients for Bakers, 2nd Edition, Pan-Tech International, Inc, Texas, USA.

Course outcomes (CO)

CO1: Expose to the basic principles of baking, confectionery technology for product manufacturing

CO2: Demonstrate the different bakery, confectionery product process making

CO3: Finding the quality of ingredients and its impact on bread and cake making

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Semester V

Nutritional assessment (ND 311)

Course code	**ND 311**
Course title	**Nutritional assessment**
Course credit	**4 (2+2)**
Teaching per week	**6 h**
Course objectives	1. Understand the concept of nutritional status and its relationship to health. 2. Know aims, objectives, methods used for assessment of nutritional status. 3. Identify the factors responsible for the malnutrition.
Course content	**Theory :** 1. Nutritional status assessment and surveillance : Meaning, need and importance. 2. Diet surveys : Need, importance, methods of dietary survey. 3. Direct nutritional assessment of human groups : (i) Clinical signs – need, importance, identifying signs of PEM, vitamin A deficiency, aneamia, iodine deficiency; interpretation of descriptive list of clinical signs. (ii) Nutrition anthropometrics - need and importance, standards for references, techniques of measuring height, weight, head, chest and arm circumference, interpretation of these measurements and use of growth charts. (iii) Biochemical tests. (iv) Biophysical methods. **Practical :** **1.** Project work- Assessment of nutritional status of the community using suitable techniques.
References :	1. Saln DR, Lockwood R and Scrimshaw NS (1981) : Methods for the Evaluation of the Impact of Food & Nutrition Programme, V.N.University. 2. Rutchie JAS (1967) : Learning Better Nutrition, FAO, Rome. 3. Gopalan C : Nutritional and Health Care, Nutrition Foundation of India, Special Pub. Series. 4. Beghan I, Cap M and Dajardan B (1988) : A Guide to Nutritional Status Assessment, WHO, Geneva. 5. Gopaldas T and Seshadri S (1987) :Nutrition Monitoring and Assessment, Oxford University Press. 6. Mason JB, Habicht JP, Tabatabai H and Valverde V (1984) :Nutritional Surveillance, WHO, Geneva.
Course outcomes (CO)	**CO1:** Basic understanding regarding nutritional status of healthy and malnourished individuals **CO2:** Capable of using various methods and tools to measure nutritional status of individuals **CO3:** Knowledge of various deficiency diseases and causes malnutrition
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Therapeutic Nutrition (ND 312)

Course code	**ND 312**
Course title	**Therapeutic Nutrition**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. To gain Knowledge on dietary modifications for specific group and in various diseases. 2. To be able to plan and prepare diets for specific group and various diseases.
Course content	**Theory :** 1. An overview of groups with special nutritional needs. 2. Dietary management of industrial workers, sports persons, astronauts and defense personnel. 3. Dieses of liver : Functions of liver (review), test used for liver functions, etiology, symptoms and dietary management in - viral hepatitis, cirrhosis of liver, hepatic coma. 4. Diseases of Renal System : Functions of kidney (review), tests used for Kidney functions, etiology, symptoms and dietary management in - nephritis, nephritic syndrome, nephrolithiasis, renal failure and dialysis, low sodium diets, level of sodium restriction. 5. Diseases of cardiovascular system : Functions of heart (review), arthrosclerosis - etiology and risk factors, hyperlipemia - types and nutritional aspects for each in brief, etiology for hypertension and congestive cardiac failure. 6. Diet in diabetes mellitus : Classification and symptoms, tests used for diagnosis of diabetes mellitus, glycemic index of foods, dietary management of diabetic mellitus, diabetic coma, insulin shock and chronic complications due to diabetic mellitus. 7. Diet in cancer and HIV infection. 8. Interaction between drugs and nutrients. 9. Alternative nutrition therapy (meaning and examples) eg. nature cure etc.. **Practical :** 1. Plan and prepare diets for liver diseases: Viral hepatitis, hepatic coma. 2. Plan and prepare diets for renal diseases : Nephritis, renal failure (using protein and sodium food exchange), nephrolithiasis , nephritic syndrome. 3. Plan and Prepare diet for cardiovascular diseases : Congestive heart failure, hypertension. 4. Plan and prepare diets for diabetes mellitus using food exchanges.
References :	1. Cataldo Debryne : Nutritionand Diet Therapy, 6th Edition, Whitney Wodawath Pub. Co. 2. Allderson L, Dibble MV and Turkki PR (1982) : Nutrition in Health and Disease. 3. Antia FP (1973) :Clinical Dietetics and Nutrition, 2nd Edition, Oxford University Press, Delhi. 4. Mahan LK and Arlin MT (1992) : Krause's Food Nutrition and Diet Therapy, 7thEdition, WB Saunders Co., London. 5. Robinson CH, Lawler MR, Chenoweth WL and Gaewick AE (1986) : Normal and Therapeutic Nutrition, 17th Edition, McMillan Pub. Co. 6. Williams SR, Nutrition and Diet Therapy, 6th Edition, Times Moror Mosby College Pub., St. Louis. 7. Raheenabegum (1989) : A Textbook of Food, Nutrition and Dietetic, Sterling Tata McGraw Hill Pub., New Delhi.

	8. Joshi SA (1992) : Nutrition and Dietetics, Tata McGraw Hill Pub, New Delhi.
Course outcomes (CO)	**CO1:** To understand the therapeutic concept of chronic disease **CO2:** To plan and prepare the therapeutic diet for acute disease
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						

Hospital Dietetics and Patient Counselling (ND 313)

Course code	**ND 313**
Course title	**Hospital Dietetics and Patient Counselling**
Course credit	**3 (2+1)**
Teaching per week	**4 h**
Course objectives	1. Understand the dietetic department in the hospital. 2. Plan, organize/supervise, preparation and service of different kinds of therapeutic diets in hospitals dietary services. 3. Develop skill for patient counselling. 4. Interact effectively with patients and their families to give dietary advice, in the contest of the patients socio cultural and economic milieu.
Course content	**Theory :** 1. Principles of hospital dietetics, dietician as a part of medical team and outreach services. 2. Dietetics department : Structure, administration and function, food service in hospital. 3. Clinical information : Medical history, assessment of patient profile, methods of dietary assessment - dietary diagnosis and test for nutritional status, correlating clinical and dietary information. 4. Patient education and counselling : Counselling process and its significance, assessment of patient needs, establishing report, counselling relationship, resources and aids to counselling. 5. Pre requisites and preparation for setting up a counselling centre. 6. Therapeutic adaptation to normal diet for : Consistency, temperature, nutrients and amount. 7. Modes of feeding : Enteral and parenteral feeding, composition of tube feeding. 8. Aesthetic attributes of diets, follow up visits and patients education. **Practical :** 1. Lay out of a dietetics department. 2. Modification and preparation of diets for therapeutic purposes in terms of consistency, nutrients, temperature and quantity. 3. Preparation of audio-visual aids for diet counselling. 4. Planning and preparation of diets for patients suffering from more than one diseases. 5. Visit to dietary department of a hospital: Observation of clinical signs and diet served / consumed by patient. 6. Case studies on dietary counselling for specific diseases: Nutritional and biochemical profile, therapeutic modification of diets, report writing.

	7. Organizing counselling camps for specific diseases like GIT disorders, renal disorders, liver diseases, cardio-vascular diseases, hormonal- metabolic disorders, protein energy malnutrition, iodine deficiency disorders.
References :	1. Dryden W (1989): Counselling Individuals: The Rationale Motive Approach, Taylor Francis, London. 2. Dave Indu (1984) : The Basic Essential of Counselling, Sterling Pub. Pvt. Ltd., New Delhi. **3.** Barki BCand Mukhopadhay B (1989) : Guidance and Counselling, A Manual Sterling Pvt. Ltd., New Delhi.
Course outcomes (CO)	**CO1:** Understand the dietetic department structure and role of their staff **CO2:** Aware about how to do patient counselling
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						

Food and Beverage Services (FS 311)

Course code	**FS 311**
Course title	**Food and Beverage Services**
Course credit	**3 (1+2)**
Teaching per week	**5 h**
Course objectives	1. Gain knowledge of the types of food services in India and the factors which have led to their development. 2. Understand the special characteristics of food service establishments. 3. Know the types of resources required for managing food outlets and maximize resource use. 4. Learn manpower and cost management techniques. 5. Think of starting a food service.
Course content	**Theory :** 1. Introduction to food service institution : Development of food service institutions in India, types, style and characteristics of food service establishments. 2. Floor planning and layout. 3. Food service management : Definition, principles and functions, tools of management, types of menu and menu card, resources. 4. Approaches to management : Traditional management, systems approach, management by objectives, total quality management. 5. Management of resources - Finance, spaces, equipment and furniture, materials, staff, time and energy. 6. Personnel management : Definition, development and policies, selection and induction, desirable qualities, employee benefits, training and development, human relations, trade union negotiation and settlement. 7. Financial management : Definition and scope, budgeting, costs and their control, management accounting, profit planning. **Practical :** 1. Development of recipe book. 2. Preparation of various types of menu cards. 3. Table setting, maintenance of accounts and record keeping. 4. Visit to different food service institutions.

References :	1. Boella MJ (1983) : Personnel Management in the Hotel and Catering Industry, 3rd Edition, Hutchinson, London. 2. Hitchcock MJ (1980) : Food Service Systems Administration, Macmillan, New York. 3. Kotas R (1972) : Accounting in the Hotel and Catering Industry Intertext Books, 3rd Edition, Bitler and Tanner, London. 4. Moore CL and Jaedicke RK : Managerial Accounting, South Estern Pub. Co. 5. West BB and Wood L, Revised By Hargar VF, Shugart GS and Payne - Palacio J. (1989) : Food Service in Institutions, 6th Edition, McMillan Pub. Co., New York. 6. Verghese B (1999) : Professional Food & Beverage Service Management.
Course outcomes (CO)	**CO1:** Knowledge regarding food services and its characteristics **CO2:** Aware about the approaches of management and different resources **CO3:** Aware about the financial management of food services
Mapping between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Convenience and Health Food (FS 312)

Course code	**FS 312**
Course title	**Convenience and Health Food**
Course credit	**3 (1+2)**
Teaching per week	**5 h**
Course objectives	1. To get students understand the importance of convenience and health food. 2. To familiarise the students to prepare the convenience and health food.
Course content	**Theory :** 1. Convenience foods: Introduction, importance, types. 2. Cereal and pulse based convenience foods: Ready to use mixes, extruded products - vermicelli, noodles, spaghethi and macaroni etc. Spices and pulse based convenience foods: Ready to use curry mixes, soup mixes - tomato, mushroom and corn soup mixes, ready to use sweet mixes. 3. Health food : Introduction, definition, importance, scope, types, characteristics, functional foods and nutraceuticals. 4. Health and clinical benefits of consuming health foods. **Practical :** 1. Familiarisation of equipments used for convenience foods. 2. Standardization and preparation of ready to use mixes - *idli, rava-dosa, idiappam, adai, vadai, bajji, pakoda;* extruded products, cereal and pulse based traditional foods - *vadagam, appalam;* curry mixes - *sambar and rasam* powder, masala powder - chicken, fish and mutton; soup mixes - vegetable, mushroom and corn; sweet mixes - *halwa, kheer, gulabjamun, jangiri,* cake and ice cream mix. 3. Visit to processing unit. 4. Market survey of convenience and health foods. 5. Preparation of dietetic foods.

References :	1. McGinnies WG(1971):Food, Fiber and the Arid Lands, University of Arizona Press, Tucson
Course outcomes (CO)	**CO1:** Knowledge regarding convenience food such as ready to serve and ready to eat type foods **CO2:** Knowledge regarding functional foods and neutraceutical **CO3:** Efficiency in preparing health or function foods for various disorders

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						

Entrepreneurship Development (SC 311)

Course code	**SC 311**
Course title	**Entrepreneurship Development**
Course credit	**2 (1+1)**
Teaching per week	**3 h**
Course objectives	1. To understand the importance of the entrepreneurship. 2. To impart information on various schemes of the government useful to the entrepreneurs. 3. To help the students to learn and understand importance of skills and attitudes of a successful entrepreneur. 4. To acquaint the students the basic concerts of project report. 5. To help and motivate students to adopt the career of an entrepreneur in future.
Course content	**Theory :** 1. Concept, need and process of entrepreneurship development and qualities of successful entrepreneur. 2. Identification of opportunities as food enterprises. 3. Government policies and schemes for entrepreneurship development : Industrial policy of the central as well as the state governments, incentives given to SSI sector, cottage industries etc., special scheme for woman entrepreneurship, agencies helping and useful to the entrepreneurs other than government such as Banks, DIC, GSFC, DIIC, IDBI, ICICI, GIDC etc. 4. Types of industries, resources available for the industries demand based and resource based, import substitute and export promotion industries. 5. Developing entrepreneurial competencies. 6. Project formulation : Market survey techniques, product selection and development technology, quality control, major steps involved in setting up SSI unit , project formulation (writing), resource mobilization, financing procedure and source, pricing, advertising, packaging, label interventions, plan layout, process planning for the food products. 7. Critical path method : Project evaluation, review techniques as planning tools for establishing SSI. 8. Creativity and innovation- Problem solving, personnel fragment. 9. Provision of various industrial as well as labour laws, such as factories act, minimum wages act, income tax etc.; legislation - licensing, registration.

Practical :

1. Conduct of mini market survey : Data collection through questionnaire and personal visits.
2. Entrepreneurship motivation training through games, role playing, discussion and exercises.
3. Working capital and fixed capital assessment and management practice.
4. Analysis of sample project report discussion.
5. Food costing, calculation using relevant information, break even analysis etc.
6. Visit to small scale industries, study of pertinent enterprises in detail.
7. Interaction with successful entrepreneurs.
8. Preparation of project proposal for funding by different agencies.

References :

1. Deshpande V (1984) : Entrepreneurship of Small Scale Food Industries, Concept, Growth and Management, Deep and Deep Publication,New Delhi.
2. Meredith GGand Nelson RE (1982) :Practice of Entrepreneurship,ILO, Geneva.
3. Parek U and Rao TV (1978) :Personal Efficacy in Developing Entrepreneurship, Learning Systems, New Delhi.
4. Rao TV and Parekh LU (1982): Developing Entrepreneurship - A Handbook Learning Systems,New Delhi.
5. Entrepreneurship Development - A Handbook for Entrepreneurs, Entrepreneurship Development Institute of India, Bhat Gam, Ahmedabad – Gandhinagar Highway.

Course outcomes (CO)

CO1: Students will have knowledge about foundation of entrepreneurship and its theories

CO2 : Students will be able to enhance their entrepreneurial skills

CO3 : Learner will understand steps involved in starting new venture

CO4 : Students will be able to explore marketing methods and new trends in entrepreneurship

CO5 : Enhance employability

Mapping between COs and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						
CO3						
CO4						
CO5						

Semester VI

Training and Project Report (TP 601)

<table>
<tr><td>Course code</td><td>TP 601</td></tr>
<tr><td>Course title</td><td>Training and Project Report</td></tr>
<tr><td>Course credit</td><td>20 (0+20)</td></tr>
<tr><td>Teaching per week</td><td>40 h</td></tr>
<tr><td>Course objectives</td><td>1. To develop knowledge and specific skills of working in hospitals as dietician.
2. To develop knowledge and specific skills of working in food industry.</td></tr>
<tr><td>Course content</td><td>Practical :
1. The students will be placed for on the job training at government, semi government, charitable trust, public limited, private hospital or any other institutes related to field for a period of 12 weeks. Where they will be exposed to and will be trained in the following areas :
(i) Hospital administration, function, structure with special reference to dietetics.
(ii) Food service in hospital, feeding methods.
(iii) Patient counselling.
2. Report writing and presentation of on the job training.
Evaluation will be based on trainees' performance at the training place as well as on report and presentation before a panel of experts as decided by the Principal.</td></tr>
<tr><td>References :</td><td>-</td></tr>
<tr><td>Course outcomes (CO)</td><td>CO1: Develop knowledge and experience of hospital and food industry management and their running process
CO2: Expose to the industrial production of food products
CO3: Familiarization with various equipment's, methods and processing operations
CO4: Explore the packaging, product development, quality control and project related activities at industry
CO5: Assessing the interests and abilities in food processing field and hospital field and explore career alternatives</td></tr>
<tr><td>Mapping between COs and PSOs</td><td>
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<tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td><td>PSO6</td></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO4</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO5</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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