CURRICULUM FRAMEWORK AND SYLLABI FOR

MASTER OF SCIENCE IN FOODS AND NUTRITION

(FOR THE CANDIDATE TO BE ADMITTED FROM THE ACADEMIC YEAR 2018-19)

(UNDER CHOICE BASED CREDIT SYSTEM-CBCS)

DEPARTMENT OF HOME SCIENCE

MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL

PRELUDE

The Department of Home Science was started in the year 1985. The Department aims to maximize student's potential through scientifically planned, multidimensional, skill oriented curriculum to excel in the areas of home science. The Department provides opportunities to students to grow beyond classroom through a wide range of extracurricular activities, programs and services through the maintenance of environment, cultural and intellectual diversity. The students have more scope to get the exposure for research, projects, internships, industrial visits and placements.

VISION

The vision of the department is to endeavor women by inculcating scientific knowledge and skills in the field of Textiles and Clothing and Foods and Nutrition.

MISSION

- To provide opportunities for all-round development of the students and excellence in higher education, research and extension in the field of textile, food and nutrition sciences.
- To empower learners in achieving their professional goals.
- To keep the students updated with scientific and technological developments.
- To enhance creativity, innovation, research and craftsmanship through training
- **To facilitate and enhance the personality of students skill in critical thinking, communication, leadership and computer literacy.**
- To establish collaborative links with industrial, commercial and public

PROGRAMME OUTCOMES (PO)

The Expected Programme Outcomes on completion of M.Sc. Foods and Nutrition

PO1: Provide quality education to make the students technically competent to face the challenges in the field of Food Science, Nutrition and Dietetics.

PO2: Impart knowledge and skills necessary to work in research laboratories, food industries, health sector and at the community level.

PO3: Synergize a new generation with professional competence to face the challenges of the food processing sector.

PO4: Provide advanced knowledge and skills in highly job oriented courses in the areas of Food Processing, Quality Control, Food Safety, and Nutritional Sciences.

PO5: Conduct need based multidisciplinary research for improving the livelihood of the community and the nation.

PO6: Identify food based strategies for alleviating nutritional problems to achieve nutrition and health security.

PO7: Develop entrepreneurial skills by providing skill development programmes in commercial food processing

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1 - Understand the nature and basic concepts in the field of Food Science and Nutrition.

PSO2 -Understand the applications of research for improving the livelihood of the community

PSO3 -Analyze the relationship between diet and health and impart knowledge to alleviate nutritional problems and to achieve health security.

PSO4 -Acquire knowledge and skills and perform procedures necessary to work in research laboratories, food industries, health sector and at the community level.

PSO5 -Apply knowledge on employability and entrepreneurial skills in the field of food science and nutrition

MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL							
M.Sc-FOODS AND NUTRITION							
STRUCTURE2018-2019							
SEM	**CODE**	**TITLE**	**HRS**	**CRE**	**INT**	**EXT**	**TOT**
I	PFNT11	Research methods and statistics	5	5	25	75	100
	PFNT12	Human physiology	5	5	25	75	100
	PFNT13	Advanced Food science	5	5	25	75	100
	PFNE11	Fundamentals of food technology	5	5	25	75	100
	PFNP11	Practical I Advanced food science	5	5	25	75	100
		Total	**25**	**25**			**500**
II	PFNT21	Food microbiology	5	5	25	75	100
	PFNT22	Community nutrition	5	5	25	75	100
	PFNT23	Nutritional Biochemistry	5	5	25	75	100
	PFNE22	Home science composite	5	5	25	75	100
	PFNP22	Practical II- Public health nutrition	5	5	25	75	100
		Total	**25**	**25**			**500**
III	PFNT31	Nutrition through life cycle	5	5	25	75	100
	PFNT32	Advanced Nutrition I	5	5	25	75	100
	PFNT33	Advanced Dietetics	5	5	25	75	100
	PFNE33	Food processing	5	5	25	75	100
	PFNP33	Practical-III Therapeutic nutrition	5	5	25	75	100
		Total	**25**	**25**			**500**
IV	PFNT41	Advanced nutrition-II	5	5	25	75	100
	PFNT42	Nutraceuticals and functional foods	5	5	25	75	100
	PFND41	Dissertation	5	5	25	75	100
		Total	**15**	**15**			**300**
		Grand total		**90**			**1800**

CREDIT DISTRIBUTION

S.NO	COURSES CATEGORY	CREDITS	PERCENTAGE OF CREDITS TO TOTAL CREDITS
1	Core Theory	55	61
2	Core Practical	15	16.66
3	Major Based Electives	15	16.66
4	Projects	5	5.55
TOTAL		**90**	**99.87** **100%**

AVERAGE PERCENTAGE OF THE COURSES HAVING FOCUS ON SKILLS

S.No	Course	Employability	Skill	Ent*	Knowledge
1.	Research methods and statistics				Y
2.	Human physiology				Y
3.	Advanced Food science	Y			
4.	Practical I Advanced food science		Y		
5.	Food microbiology	Y			
6.	Community nutrition				Y
7.	Nutritional Biochemistry				Y
8.	Practical II-Public health nutrition		Y		
9.	Nutrition through life cycle				Y
10.	Advanced Nutrition I	Y			
11.	Advanced Dietetics	Y			
12.	Practical-III Therapeutic nutrition		Y		
13.	Advanced nutrition-II				Y
14.	Nutraceuticals and functional foods	Y			
	Core courses Total	**5**	**3**		**6**
15.	Fundamentals of food technology			Y	
16.	Home science composite				Y
17.	Food processing			Y	
18.	**Elective courses total**			2	1
19.	Dissertation	Y			
20.	**Project**	1			

Type of course	Employability	Skill	Ent*	Knowledge
Core Courses-Total	5	3		6
Elective Courses - Total			2	1
Others – Total	1			

Course Code & Title	Semester-I Research Methodology and Statistics		
PFNT11	**Semester-I**	**Credits:5**	**Hours:5**
Cognitive Level	**K2: Understand** **K3: Apply** **K4: Analyze**		
Learning Objectives	The Course aims to ➢ Learn some basic concepts of research and statistical analysis. ➢ Understand different types of research ➢ Study about scientific investigation to solve problem, test hypotheses, develop or invent new products. ➢ Gain knowledge on research process and report preparation		

UNIT I: Research methodology: an overview

Meaning of research- process of research, objectives of research. Developing a research proposal, presentation of a problem, identifying the problem- defining and delimiting the problem, types of research, different types of experimental designs, tools of research.

UNIT II : Data analysis

Measure of Central tendency: Mean, Median, Mode and their uses with applications

Measure of Dispersion: significance and methods used in studying dispersion and their uses with applications.

UNIT III: Probability and non-probability sampling

Methods of sampling- probability and non- probability, Hypothesis- meaning and types of hypothesis.

UNIT IV: Statistical analysis

Co-efficient of correlation, basic concepts in regression, Student- "t" test, analysis of variance- one way and two way classification- characteristics of ANOVA, Chi-square, Application of Duncan's table in research.

UNIT V : Concept of research report

Research reports- basic concepts of research report

a. Preliminaries- title page, acknowledgement, list of tables, list of figures, index.
b. Main text.
c. Data analysis- quantitative, qualitative, presentation of data- tables, graphs, illustrations using computer.
d. Bibliography, glossary, appendices.

REFERENCES

Text books

1. S.P.Gupta (1993), Statistical methods, Sultan chand and sons, Daryagang, New Delhi.
2. Kothari.C.R. (1991) Research methodology, methods and techniques, Wiley Eastern Ltd, New Delhi.
3. Wilkinson and Bhandarkar.P.L.C. Methodology and techniques of social research, Himalaya publishing house, Bombay.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	**CO1**	**Research design and concepts**
K3	**CO 2**	**Application of Statistics in research**
K4	**CO 3**	**Analyzing the process of developing a Research Plan.**
K2	**CO 4**	**Research process and report preparation**
K3	**C05**	**Efficient usage of different statistical tools and interpretation of data**

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	M	S	M	M	M	S	M	S	M
CO2	M	S	M	M	S	M	M	M	S	M	S	M
CO3	M	S	M	M	S	M	M	M	S	M	S	M
CO4	M	S	M	M	S	M	M	M	S	M	S	M
CO5	M	S	M	M	S	M	M	M	S	M	S	M

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

Course Code & Title	**HUMAN PHYSIOLOGY**		
PFNT12	**Semester-I**	**Credits:5**	**Hours:5**
Cognitive Level	**K1: Recall** **K2: Understand** **K4: Analyze**		
Learning Objectives	**The Course aims to** 1. Address the structure and functions of systems in human body. **2.** Integrate the functions of all the systems and disease conditions.		

UNIT I : Cell components

Cellular basis of Physiology - Body fluid compartment, membrane potential, cell structure and functions - Regulation of cell multiplication.

Blood: functions, composition, blood cells, plasma and serum. Functions of hemoglobin, erythropoesis, factors affecting haemotopoesis, destruction of erythrocytes and Anemia. Leucocytes- genesis and functions. Regulation of pH,Blood coagulation- mechanism, conditions causing excessive bleeding, anticoagulants, functions of platelets.

UNIT II : Immunity and circulatory system

Immune System: Immunity - Properties, natural and acquired Immunity, features of immune responses, antigen - antibodies - types, properties, and antigen - antibody interaction, Auto immune disorder and allergy.

Circulatory System: Structure and function of the heart and blood vessels. Regulation of cardiac output, cardiac cycle, blood pressure.

UNIT III: Gastrointestinal system

Digestive System: Review of structure and function of various parts in gastrointestinal tract in brief. Role of liver, pancreas, gall bladder and their dysfunction. Role of specific hormones associated in GI tract.

UNIT IV : Excretory system and regulation

Excretory System: Anatomy and physiology of kidneys and nephron. Formation of urine, acid-base balance, regulation of body temperature- thermo genesis, thermolysis, BMR.

UNIT V: Endocrine and reproductive system

Endocrine system: Anatomy and physiological functions of endocrine glands: Hormones - Mode of action - Pituitary, Adrenal, Thyroid, Parathyroid,Sex glands and Pancreas. Hypo and Hyper activities of the glands.

Reproduction System: structure, physiological functions of male and female reproductive organs, menstrual and ovarian cycle, spermatogenesis, contraceptives, infertility and its recent developments, Rh factor.

REFERENCES

Text books

1.Chattergee C.C.(1992): Human Physiology Vol I and II 11th edition Medical Allied Agency, Calcutta.

2. Sembulingam (1998) Medical physiology , New age International publishers.

Other references

1. Ganong W.F.(1985): Review of Medical Physiology 12th edition Lange Medical Publication

2. Moran Campell E.J, Dickinson C.J, Slater J.D, Edwards C.R.W and Sikora (1984): Clinical Physiology 5th edition ELBS Blackwell Scientific Publications.

3. Guyton A.C (1985): Functions of the Human Body 4th edition W.B. SaundersCompany Philadelphia.

4. Guyton A.C and Hall J.B(1996): Textbook of Medical Physiologt 9th edition W.B. Saunders Company, Prime Books(Pvt) Ltd. Bangalore.

5. Wilson K.J.W and Waugh.A(1996): Ross and Wilson Anatomy and Physiology in Health and Illness 8th edition Churchill Livingstone.

6. Kale C.A. and Neil F Samean (1974): Wright's Applied Physiology.

7. Griffith's M (1974): Introduction to Human Physiology MacMillan and Co.

8. Green J.N(1972): An Introduction to Human Physiology.

9. McArdle W.D, Katch F.I and Katch V.L(1996): Exercise Physiology, Energy Nutrition and Human Performance 4th edition Williams and Wilkins, Bailimore.

Course Outcome

On successful completion of the course, the students will be able to gain knowledge about

K2	**CO1**	Understand the Composition and Functions of Blood, Haemostasis, Homeostasis, Blood Coagulation, Anemia, Blood Transfusion and Blood Groups
K4	**CO 2**	Analyse the structure and functions of Cardiovascular and immune Systems
K2	**CO 3**	Understand the Anatomy and Physiology of the Digestive System
K1	**CO 4**	Learn the Structure and Functions of the excretory system
K2	**C05**	Understand the Anatomy and Physiology of Male and Female Reproductive Systems and endocrine system.

Mapping of Cos with POS & PSOs:

CO/ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	M	**S**	M	**S**	**S**	**S**	M	**S**	M	**S**	**S**	M
CO2	M	**S**	M	**S**	**S**	**S**	M	**S**	M	**S**	**S**	M
CO3	M	**S**	M	**S**	**S**	**S**	M	**S**	M	**S**	**S**	M
CO4	M	**S**	M	**S**	**S**	**S**	M	**S**	M	**S**	**S**	M
CO5	M	**S**	M	**S**	**S**	**S**	M	**S**	M	**S**	**S**	M

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code & Title	ADVANCED FOOD SCIENCE		
PFNT13	**Semester-I**	**Credits:5**	**Hours:5**
Cognitive Level	**K2: Understand** **K3: Apply** **K4: Analyze**		
Learning Objectives	**The Course aims to** 1. The characteristics and behaviour of food constituents during processing 2. The changes in physiochemical and functional properties of food constituents due to processing 3. The uses of ingredients in food product development		

UNIT I

Food classification by ICMR, FSSI

Cereals - Rice & wheat and other Millets - Composition,Nutritive Value and Processing.

Role of starch and gluten in cookery

UNIT II

Pulses and legumes–Nutritive value, types, Processing and specifictoxic constituents Vegetables-Classification, Nutritive value, Changes on Cooking – pigments.;

Fruits - Classification, Nutritive value, ripening of fruits, changes on ripening andpectic substances

UNIT III

Egg - Structure, Composition, Nutritive value and Role of egg in cookery.

Meat - Structure, Composition, Nutritive value, Changes on cooking and Rigor mortis. Poultry - Composition, Nutritive value, changes on cooking.

Fish - Composition, Nutritive value, Selection, Spoilage, Changes on Cooking.

UNIT-IV

Milk - Classification, Nutritive value, Putrefaction.

Fats & Oils – Types, properties of fat relating to cooking, Rancidity, Tests for rancidity, Hydrogenation, role of fats in cookery.

UNIT-V

a. Sugar cookery - Types of sugar, Properties, Crystallization, Stages in Sugar cookery, Application in Indian recipes.
b. Beverages –Basic Classification, Nutritive value, Preparation of milk based beverages.
c. Spices and Condiments

References

Text books

1.Food facts and principles, Sakuntala Manay and shadaksaraswamy, M (1987) allied Publishers, New Delhi.

2. Food science, Potter N.N. (1996) CBS publishers & distributors, Delhi

3. Srilakshmi, B. (1996) Food Science, New Age International (P) Ltd. New Delhi.

Other references

1. Food Science and experimental foods, Swaminathan, N. (1987) Ganesh Publications, Madras.

2. Food chemistry, Meyer L.M.(1969) Van Noustrand Reinhold co., New York.

3. Foundations of Food Preparation, Peckham, C.G. (1979), the Macmillan co., London.

5. The experimental study of foods, Griswald R.M. (1962), Houghton, Muffin Co., New York.

6. Introductory foods, Bennion M. and Hughes, D. (1975), Macmillan publishing Co., New York.

Course outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	**CO1**	Understand the importance of food groups based on the nutrient value to enable meal plann ng in cereals
K2	**CO2**	Learn the scientific basis of preliminary of food: pulses and fruits
K3	**CO3**	Enhance conservation of nutrients and acceptability of food preparation in egg and fish
K2	**CO4**	Enrich the knowledge on advanced food science in milk and oil.
K4	**CO5**	Analyze the effect of processing and storage on nutritional composition of sugar, beverages, and spices

Mapping of Cos with POS & PSOs:

CO/ PO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	S	S	S	S	M	S	S	S	M	M	S	M
CO2	S	S	S	S	S	M	S	S	S	M	M	S	M
CO3	S	S	S	S	S	M	S	S	S	M	M	S	M
CO4	S	S	S	S	S	M	S	S	S	M	M	S	M
CO5	S	S	S	S	S	M	S	S	S	M	M	S	M

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code & Title	FUNDAMENTALS OF FOOD TECHNOLOGY		
PFNE11	Semester-I	Credits:5	Hours:5
Cognitive Level	K1-Recall K2: Understand K3: Apply K4: Analyze		
Learning Objectives	The Course aims to 1.To have appropriate knowledge about significance of food technology 2.To formulate the various food products through various food techniques		

UNIT I : Introduction about food technology

Food technology- definition, introduction to terminology, principles involved in food technology

UNIT II : Food processing techniques

Recent trends in food processing technology in brief

UNITIII : Fermentation and its by products

Fermentation Technology - Definition, types of aerobic and anaerobic fermentation Steps in fermentation, Fermented Food Products from various food groups, Dairy products, Beverages and related products of baking.

UNIT IV: Enzyme technology

Enzyme Technology - Production of enzymes - Amylase, Protease, Lipase, Lactase and pectinase, Use of enzymes in food & beverage industry (eg Cheese, fruit, juice, Wine, Meat tenderizing & dairy).

UNIT V: Food packaging and its importance

Food packaging technology and labeling: types of packages-traditional and modern Design and testing of package materials, package performance. Principles in the development of safe and protective packing, safety assessment of food packaging materials. Recent packaging methods-principles-hazards related to packaging (PCB,PCPs etc.,).

REFERENCES

Text books

1. Swaminathan, M., Foodscience, Chemistry and Experimental Foods,Bappco Publishers, 2005.

2.Paul, P.C., and Palmer, H. H., Food Theory and Applications. JohnWiley and Sons, Newyork, 2000 Revised Edition.

3. Srilakshmi, M., Foodscience, New Age International (P) Ltd.,Publishers 2010.

Other references

1. George J.B., Basic Food Microbiology, CBS Publishers Distributors, 1987.

2. James M .J. Modern Food Microbiology, CBS Publishers & Distributors, 1987.

3. Lindsay, Willis Biotechnology, Challenges for the flavor and food Industries, Elsevier Applied Science, 1988.

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	**CO1**	Understand the food technology principles
K1	**CO2**	Know about the food preservation, food spoilage and role of micro organisms
K1	**CO3**	Learn about food fermentation techniques and its products
K4	**CO4**	Analyze to gain information on advanced food techniques
K2	**CO5**	Gain awareness on fundamental of food technology in packaging aspects.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	M	S	S	M	M	S	S
CO2	S	S	S	S	M	M	S	S	M	M	S	S
CO3	S	S	S	S	M	M	S	S	M	M	S	S
CO4	S	S	S	S	M	M	S	S	M	M	S	S
CO5	S	S	S	S	M	M	S	S	M	M	S	S

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code & Title	**PRACTICAL I** **ADVANCED FOOD SCIENCE PRACTICALS**		
PFNP11	**Semester-I**	**Credits:5**	**Hours:5**
Cognitive Level	**K2: Understand** **K5: Evaluate** **K6: Create**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. Do various testing methods for determination of food constituents 2. Know the influence of processing conditions on physiochemical properties of food constituents		

1**. Food Evaluation**:-Visual examination of foods & sensory evaluation.

2. **Cereal cookery**–Dextrinisation, caramelisation and gelatinization. Study the development of gluten.

2. **Pulse cookery** - Effects of soaking, acid, alkali and sprouting and different methods of cooking on cooking time and quality of pulses.

3. **Vegetable cookery** - Effect of acid, alkali and methods of cooking on pigments.

4. Egg, meat, fish, poultry –Study of cooking time on different types of meat.

5. **Fats and oils** - Smoking point of different fats and oils

6**. Sugar cookery** - Stages of sugar cookery, uses of sugar in Indian recipes. Crystallization and factors affecting crystallization.

7. Milk cookery- effect of acid, salt, heat on milk proteins.

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K5	**CO1**	Gain awareness on food evaluation techniques.
K5	**CO2**	Study various cookery methods and its evaluation procedures in cereals, pulses and vegetable cookery.
K5	**CO3**	Evaluate the cooking principles on meat and poultry
K2	**CO4**	Analyze the smoking point of different fats and oils.
K6	**CO5**	Develop various sugar based recipes food analytical techniques on sugar and milk cookery.

Mapping of Cos with POS & PSOs

CO/ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	**S**	**S**	**S**	**S**		**M**	**S**	**S**	**M**	**M**	**S**	**S**
CO2	**S**	**S**	**S**	**S**		**M**	**S**	**S**	**M**	**M**	**S**	**S**
CO3	**S**	**S**	**S**	**S**		**M**	**S**	**S**	**M**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**S**		**M**	**S**	**S**	**M**	**M**	**S**	**S**
CO5	**S**	**S**	**S**	**S**		**M**	**S**	**S**	**M**	**M**	**S**	**S**

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code & Title	**SEMESTER II** **FOOD MICROBIOLOGY**		
PF NT21	**Semester-II**	**Credits:5**	**Hours:5**
Cognitive Level	**K1: Recall** **K2: Understand** **K4: Analyze**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. Clarify the communications between microorganisms and food environment. 2. Illustrate the characteristics of food borne, water borne and spoilage microorganisms,. 3. Effects of fermentation in food production and how it influences themicrobiological quality and status of the food product.		

UNIT-I

Food microbiology in Review- Morphology and Taxonomy of microorganisms. Methods of Isolation and identification of Microorganisms or their products in food

-ELISA

-PCR (Polymer chain reactions) -only principles in brief.

UNIT-II

Spoilage and contamination of common foods: causes and types of microorganisms responsible for spoilage and the contamination of common foods. Cereal and cereal products. Fruits and vegetables. Egg, meat, poultry, sea foods, milk and milk products.

Role of microorganisms in putrefaction and decay and fermentation-part played by microorganisms in putrefaction and decay. Fermentation, types- aerobic respiration and anaerobic respiration. Products of fermentation: yeast, yogurt, cheese, meat, beer, vinegar, fruits and vegetables.

UNIT-III

Destruction of bacteria, food poisoning and food borne diseases- salmonella food poisoning, staphylococcus food poisoning, botulism, clostridium welchi, shigellosis. Food borne diseases- bacterial- staphylococcus, streptococcus. Diphtheria, scarlet fever, tuberculosis, hepatitis. Measures to prevent food poisoning and food borne disease: sterilization- application of dry and moist heat, use of filters. Disinfection- methods of disinfection- natural, physical and chemical.

UNIT-IV

Food Sanitation- microbiology in food plant sanitation, bacteriology ofwater, sewage and waste treatment and disposal. Microbiology of thefood product.Indicators of food safety and quality- microbiological criteria of foodsand theirsignificance.

UNIT-V

HACCP system and food safety- Introduction, need, benefits,& principlesof HACCP.

- Guidelines for application of HACCP principles.

-The HACCP system in India Food control and enforcement agencies-Food standards and regulation inIndia.

Codex principles of food hygiene and HACCP.

Nutrition labeling, regulation on fortified foods.

Safety issues: FSMS-Certification, residues in foods, mycotoxins, storage principles and transportation of RTE foods.

Food additives - Definitions, Types, Action. Leavening agents - Definitions, Classifications. Colour of foods - Natural colors, certified artificial colors, Non-certified colors, Use and Optimum levels.

REFERENCES

1. Relezar, M.I and Reid, R.D.(1993): Microbiology, McGraw Hill Book Company New York 5th edition.

2. Atlas, M .Ronald (1995): Principles of microbiolody 1st edition, Mosby Year Book, Inc, Missourin, USA.

3. Topley and Wislson's(1983): Principals of Bacteriology, Virology and ImmUNIT y Edited by S.G. Wilson, A. Miles and M.T. Parkar vol1; General Microbiology and ImmUNIT y II: Systematic Bacteriology 7th edition Edward Armold Publisher.

4. Block, J.G. (1999) Microbiology Principles and Explanations 4th Edition, John Wiley and sons Inc.

5. Frazier, W.C. (1988) Food Microbiology McGraw Hill Inc 4th Edition.

6. Jay James, M(2000): Modern Food Microbiology 6th Edition Aspen Publishers Inc, Maryland.

7. Banwart, G(1989) Basic Food Microbiology 2nd Edition CBS Publisher.

8. Garbutt, J(1997): essentials of Food Microbiology, 1st Edition Armold International Students Edition

9. Doyle, P, Bemehat, L.R. and Mantiville, T.J(1997): Food Microbiology- Fundamentals and Frontiers, ASM Press, Washington, D.C.

10. Adams, M.R and M.G. Moss(1995): Food Microbiology 1st Edition New Age International(P) Ltd.

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K1	**CO1**	Recall the knowledge of general characteristics of micro- organisms and their role in food spoilage.
K2	**CO2**	Gain knowledge of microorganisms in health and diseases.
K4	**CO3**	Learncodex principles in food labeling and packaging.
K2	**CO4**	Obtained knowledge on impact of microbes in food processing industry.
K2	**CO5**	Acquire knowledge on food safety regulations.

Mapping of Cos with POS & PSOs

CO/ PO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	M	S	S	M	M	S	S
CO2	S	S	S	S	S	S	M	S	S	M	M	S	S
CO3	S	S	S	S	S	S	M	S	S	M	M	S	S
CO4	S	S	S	S	S	S	M	S	S	M	M	S	S
CO5	S	S	S	S	S	S	M	S	S	M	M	S	S

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code & Title	**COMMUNITY NUTRITION**		
PFNT22	**Semester-II**	**Credits:5**	**Hours:5**
Cognitive Level	**K1: Recall** **K2: Understand** **K4: Analyze** **K5: Evaluate**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. to assess the health status of the community 2. to know the various organizations related with food and nutrition with its functions		

UNIT I

Definition and key concepts – community, nutritional anthropology (community health)health situation in India, concept of disease, causation (Agent, host, environmental factors) concept, control and prevention, modes of intervention.

UNIT II

Nutritional epidemiology: classification

Indirect methods - Demography, population dynamics and vital events and their health implications, indicators of health and nutrition (IMR, TMR, MMR).

Direct methods - Anthropometry, Biochemical, Clinical, Dietary and Functional indices of assessments.

UNIT-III

Elements & principles of health care, Millennium Development Goal (1,4,5,6), five year plan, health care delivery system (primary health care), pyramidal structure of health care service, agencies (Govt. and Private) in delivery health care services, health programmes in India. International agencies.

UNIT-IV

Communicable and non-communicable diseases

Epidemiology

-Prevalence

-Source of infection

-Vaccination schedule

- Preventive measures

UNIT-V

Health Education: adoption of new ideas & practices, content & principles of health education, audio-visual aids in health education. Small group and mass communication.

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1. Owen, A.Y. and Franke, R.T. (1986): Nutrition in the CommUNIT y, The Art of Delivering Services, 2nd Edition Times Mirror/Mosby.

2. Park, K. (2000): Park's Textbook of Preventive and Social Medicine, 18th Edition, M/s. BanarasidasBhanot, Jabalpur.

3. SCN News, UN ACC/SCN Subcommittee on Nutrition.

4. State of the World's Children, UNICEF.

5. Berg, A. (1973): The Nutrition Factor, the Brookings Institution, Washington.

6. Beaton, G.H. and Bengoa, J.M. (Eds) (1996): Nutrtion in Preventive Medicine.

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9. Gopalan, C. and Kaur, S.(Eds) (1993): Towards Better Nutrition, Problems and Policies, Nutrition Foundation of India.

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12. National Family Health Survey I & II (1993, 2000): International Institute for Population Studies, Mumbai.

13. National Policy of Action on Nutrition (1995): Food & Nutrition Board, Dept. of WCD, Govt. of india.

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15. Nutrition Education for the Public (1997): FAO Food and Nutrition Ppare, 62, FAO.

16. NIN (1998): Dietary Guidelines for Indian as Manual National Institue of Nutrition, Hyderabad.

17. Mason, J.B., Habicht, J., Tabatabai, hand Valverde, (19840: Nutrtional Surveillance World Health Organisation Geneva.

18. Gopalan, T. and Sheshadri, S. (1987): Nutrition – Monitoring and Assessment Oxford University Press. N. Delhi.

19. Who (1998): Education for Health – A Manual on Health education in Primary Health care, WHO.

20. Toreis, K. and Tilford, S. (1994): Health Education Effectiveness, Efficiency and Equity (2nd edition) Chapman & Hall London.

21. Wadhwa,A;Sharma,S(2003):Nutrition in the community, A Textbook,Elite publishing Houuse Pvt. Ltd. .New Delhi.

22. Seghal,S; Raghuvanshi;R(2007):Textbook of community nutrition, Indian council of agricultural research, New Delhi

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K1	**CO1**	Obtain a holistic knowledge base and understanding of the nature of important nutrition problems and their prevention.
K4	**CO2**	Compare the nutritional needs for the disadvantaged and upper socio-economic strata in society.
K5	**CO3**	Evaluate the causes/determinants and consequences of nutrition problems in society.
K4	**CO4**	Analyze the epidemiological issues of communicable and non-communicable diseases
K2	**CO5**	Understand the various approaches to nutrition and health interventions, programmes and policies.

Mapping of Cos with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	M	S	S	S	M	M
CO2	S	S	M	M	S	S	M	S	S	S	M	M
CO3	S	S	M	M	S	S	M	S	S	S	M	M
CO4	S	S	M	M	S	S	M	S	S	S	M	M
CO5	S	S	M	M	S	S	M	S	S	S	M	M

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code & Title	ADVANCED NUTRITIONAL BIOCHEMISTRY		
PFNT23	Semester-II	Credits:5	Hours:5
Cognitive Level	K1: Recall K2: Understand K5: Evaluate		
Learning Objectives	The Course aims to On successful completion of this course the student will be able to: 1. Understand the biochemical basis for nutrition and health 2. Understand the mechanisms adopted by the human body for regulation of metabolic pathways. 3. Get an insight into interrelationships between various metabolic pathways.		

UNIT I

BIOLOGICAL OXIDATION

Enzymes and co-enzymes involved in oxidation and reduction, respiratory chain, phosphates in biologic oxidation and energy capture, role of respiratory chain and mechanism of phosphorylation.

UNIT-II: METABOLISM OF CARBOHYDRATE

Glycolysis, Gluconeogenesis, TCA cycle, HMP shunt, bioenergetics, disorders of carbohydrate metabolism - galactosemia, glycogen storage disease, pentosuria, abnormal level in blood glucose.

UNIT-III: METABOLISM OF LIPIDS

Biosynthesis and oxidation of saturated and unsaturated fatty acids, glycerides, phospholipids and cholesterol, bioenergetics, disorders of lipid metabolism (fatty liver, atherosclerosis), lipoproteins and their significance.

UNIT-IV: PROTEIN AND AMINOACID METABOLISM

Biosynthesis of protein, general catabolism of aminoacids, deamination, transamination, urea cycle, disorders of aminoacid metabolism - phenyl ketonuria, cystinuria, albinism, alkaptonuria, maple syrup disease.

UNIT-V: METABOLISM OF NUCLEIC ACIDS

Structure of DNA , Structure of RNA, Replication, Biosynthesis of purine and pyramidine nucleotides,Disorders of purine and pyrimidine metabolism

References

1. Review of Physiological Chemistry, Harper H.A. (1997), Lange Medical Publications, Los angeles.

2. Text book of Clinical Biochemistry, T.A. Ramakrishnan (1994), Publications,Chennai.

3. Text book of Biochemistry and Human Biology, Talwar G.P.,Srivatsava LN. andMondgil K.D., New Delhi, Prentice Hall.

4. Clinical Chemistry in Dignosis and Treatment, Jean E Zilwa, Peter A. Pannale, Philip R. (1988), New York.

5. Text book of Biochemistry with Clinical Correlations, Devlin D.T. (1997), New York, John wiley and Sons.

6. An Introduction to Practical Biochemistry, Plummer D.T. (1997) New Delhi, Tata McGraw Hill Publishing Company.

7. Biomedical Instrumentation and Measurements, Cromwell L.Weibel F.J. and Pfeiffer E.A. (1996), New Delhi, Prentice Hall.

8. Electrolytes , Body fluids and Acid Base balance, Eccles R. (1993), London, Edward Arnold - A division of Hodder and stoughton.

9. DNA Protein interactions, Andrew Travens, (1993), Chapman and Hall Pub. London.

Course outcomes

On successful completion of the course, the students will be able to gain knowledge about

K1	**CO1**	Obtain on in-depth knowledge on the concepts and chemistry of biological oxidation
K2	**CO2**	Understand the concepts of macronutrient metabolism
K5	**CO3**	Evaluate the metabolism of lipids
K2	**CO4**	Acquire basic knowledge on the concepts of protein and amino acid metabolism
K2	**CO5**	Understand the role nucleic acids in metabolism

Mapping of Cos with POS & PSOs

CO/ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	S	M	M	S	S	M	S	S	S	M	M
CO2	S	S	M	M	S	S	M	S	S	S	M	M
CO3	S	S	M	M	S	S	M	S	S	S	M	M
CO4	S	S	M	M	S	S	M	S	S	S	M	M
CO5	S	S	M	M	S	S	M	S	S	S	M	M

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code & Title	HOME SCIENCE COMPOSITE		
PFNE22	**Semester-II**	**Credits:5**	**Hours:5**
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. Describe the importance of each branch of Home Science 2. Understand the essence of each subject 3. Prepare them for UGC NET, SLET and ICMR		

UNIT-I

Food science and nutrition:

-Basic concepts of food groups and nutrients.

- Role of microorganisms in food spoilage and its prevention

- Recent advances in food processing and preservation.

-Recent techniques in food technology.

Institutional management:

-Management of hospitality institutes- hospitals/hotels/restaurant/cafeteria and outdoor catering.

UNIT-II

Extension education:

- History and development of home science
- Formal/ non-formal and extension education
- Vocationalisation of home science in India
- Concept and classification of communication
- Trends in home science research

UNIT-III

Resource management

- Concept of home management and steps
- Classification of resources
- Basic characteristics of resources
- Work simplification
- Interior decoration
- House hold equipment, decision making

UNIT-IV

Human development

- Child development-principles and stages
- Life span development
- Theories of human development
- Early childhood care and education
- Family welfare programmes

UNIT-V

Textiles and clothing

- General properties of textile fibers
- Processing and manufacture of all natural and manmade fibers
- Classification of yarn: identification
- Fabric construction
- Woven, non-wove, knitted and other fabrics

REFERENCES

1. West, B Bessie & Wood, Levelle (1988): Food service in institutions 6th Edition. Revised by F.V., Shuggart S.G. &Palgne-Palacio June Macmillian Publication company New York.
2. Desseler, Garry (1987): Personnel Management Modern ,Concepts and Techniques, Prentice Hall New Jersey
3. Kumar, H.L. (1986): Personnel Management in Hotel and Catering Industries, Metropolitan Book Company N. Delhi.
4. Park, K. (2000): Park's Textbook of Preventive and Social Medicine, 18th Edition, M/s. BanarasidasBhanot, Jabalpur.
5. Textiles - Fiber to fabric, Bernard P Corbman, 6th edition, McGraw Hill Book Co, SingaporeFabric forming systems, Peter Schwartz, Trevor Rhodes, Mansour Mohammed, Noyes.
6. Jeliffe, D.B.-Assessment of the nutritional status for the community W.H.O., Geneva
7. Williams W.V.- nutrition in pregnancy and lactation C.V. Hosty and Co.

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K1	**CO1**	Obtain the in-depth knowledge in field of food science and nutrition
K2	**CO2**	Understand various concepts of home science extension education
K3	**CO3**	Apply the concepts of home science and its applications in resource management
K2	**CO4**	Learn the basic knowledge on human development.
K3	**CO5**	Gain the importance of textile and clothing in our daily life events.

Mapping of Cos with POS & PSOs

CO/ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	**S**	M	**S**	**S**	**S**	**S**	**M**	**M**	**S**	**S**	**S**	**M**
CO2	**S**	M	**S**	**S**	**S**	**S**	**M**	**M**	**S**	**S**	**S**	**M**

CO3	**S**	M	**S**	**S**	**S**	**S**	**M**	**M**	**S**	**S**	**S**	**M**
CO4	**S**	M	**S**	**S**	**S**	**S**	**M**	**M**	**S**	**S**	**S**	**M**
CO5	**S**	M	**S**	**S**	**S**	**S**	**M**	**M**	**S**	**S**	**S**	**M**

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

Course Code & Title	**PUBLIC HEALTH NUTRITION PRACTICALS**		
PFNP22	**Semester-II**	**Credits:5**	**Hours:5**
Cognitive Level	**K2: Understand** **K3: Apply** **K5: Evaluate** **K6: Create**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. To make the communication process with small and large groups 2. To create awareness among people with Mass media and advertisement. 3. To develop the tools for nutrition education		

UNIT-I

Assessment of Nutritional Status,Dietary surveys, anthropometry and body composition, biochemical and clinical methods

Stress scale (Standard), personality test (MMPI), cognition tests. Standardization of tools and techniques

UNIT-II

Development of a plan for nutrition education programmes in community. Preparation of communication aids for different groups.

UNIT-III

Development of low cost recipes for infants, preschoolers, elementary school children, adolescents, pregnant and lactating mothers

UNIT-IV

Planning and preparation of diet/ dishes for PEM, VAD and IDA Field visits to ongoing national nutrition programmes

UNIT-V

Specific regulating conditions applicable for baby foods and foods for immune competence. Special diets and its regulations

RECOMMENDED READINGS

1. Achaya, K.T. (Ed) (1984) Interface between Agriculture, Nutrition andFood Science, The United National University.
2. Beaton, G. H and Bengoa, J. M. (Eds) (1996) Nutrition in PreventiveMedicine, WHO.
3. Gibney M. J., Margetts, B.M., Kearney, J. M. Arab, I., (Eds) (2004) PublicHealth Nutrition, NS Blackwell Publishing.
4. Gopalan, C. (Ed) (1987) Combating Under nutrition- Basic Issues andPractical Approaches, Nutrition Foundation of India.
5. Kaufman M. (2007) Nutrition in promoting the public health strategies,principles and practices. Jones and Barlett Publishers.
6. Park, K. (2009) Park's Textbook of Preventive and Social Medicine, 20thed. Jabalpur M/s. Banarsidas Bhanot
7. Gibson R S. (2005). Principles of Nutritional Assessment. 2nd ed.Oxford University Press.
8. WHO (2009). WHO Child growth standards: Growth velocity based onweight, length and head circumference Available at http://www. who.int
9. WHO (2007).WHO Reference Data for Children and Adolescents (5-19years). WHO reference. Available at http://www.who.int/growthref/en/

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K3	CO1	Plan and prepare low cost nutritious dishes / menus for vulnerable groups.
K6	CO2	Develop skills in preparation of communication aids and planning nutrition education programme for the community.
K2	CO3	Familiar with the ongoing national nutrition programmes
K5	CO4	Acquire knowledge on basic community based survey and nutrition education.
K2	CO5	Gain knowledge on specific foods and its food regulations

Mapping of Cos with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**S**	**S**	**M**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**S**	**M**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**M**
CO3	**S**	**S**	**S**	**M**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**M**
CO4	**S**	**S**	**S**	**M**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**M**
CO5	**S**	**S**	**S**	**M**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**M**

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code & Title	**NUTRITION THROUGH LIFECYCLE**		
PFNT31	**Semester-III**	**Credits:5**	**Hours:5**
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1.Know the role of vegetarian diet in preventing the degenerative diseases 2. Acquire knowledge about the types of diet 3. Improve the life style through Physical Activity and Stress Coping Mechanism		

UNIT I

1. The Vulnerable sections of society - who are vulnerable, why they are vulnerable, effects of malnutrition on the vulnerable sections of society: during growth phase, malnutrition in expectant & nursing women, other vulnerable sections of society.

UNIT II

2. Nutrition in Pregnancy

Stages of gestation, maternal weight gain, complications of pregnancy, nutritional problems and dietary management, importance of nutrition during and prior to pregnancy, teenage pregnancy - nutritional problems and dietary management.

3. Nutrition in Lactation

Physiology of lactation, hormonal control and reflex action, efficiency of milk production, problems of breast feeding, nutritional composition of breast milk, nutritional concerns during lactation, special foods during lactation, dietary modification.

UNIT III

4. Nutrition in Infancy

Infant feeding, nutritional needs, premature infant and their feeding, weaning foods. Feeding problems, infant formulae lactose intolerance.

5. Nutrition in Pre-school - Physiological development related to nutrition, feeding problems, behavioural characteristics, nutritional requirement.

6.Nutrition in school children - feeding school children and factors to be considered. Nutritional requirements, feeding problems, packed lunch.

UNIT IV

7. Nutrition in Adolescents and Adults

- Physical changes
- Nutritional requirements
- Food behaviour - food habits and dietary practices.
- Nutritional problems.

UNIT V

8. Geriatric Nutrition

- The ageing process - Physiological, biochemical and body composition changes.
- Socio-psychological aspects of ageing - Special problems of elderly.
- Nutritional requirements of the elderly & dietary management to meet nutritional needs.

REFERENCES

1. Ghosh, S. (1992): The Feeding and care of Infants and Young Children, 6th Ed., New Delhi.

2. WHO (1978): A Growth Chart for International Use in Maternal and Child Health Care, Geneva.

3. Swaminathan, M. (1985): Essentials of Food and Nutrition, Vols. I and II. Ganesh & Co. Madras.

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5. Indian Council of Medical Research of Medical Research (1989): Recommended Dietary Intakes for Indians.

6. Gopalan, C (Ed.), (1993): Recent Trends in Nutrition, Oxford University Press.

7. Sachdeva, H.P.S., Chaudhary, P. (1994): Nutrition in Children. Developing Country Concerns, Dept. of Pediatrics, Maulana Azad Medical College, New Delhi.

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9. Ward, R.H.T; Smith, S.K.; Donnai, D. (eds) (1994) Early Fetal Growth and Development. London, RCOG. Press.

10. Wallace, H.M. and Giri, K. (1990) Health Care of Women and Children in Developing Countries. Third Party Publishing Co. Oakland.

11. Luke, B., Johnson, T. R.B.; Petrie, R.H. (1993). Clinical Maternal-Fetal Nutrition. Little Brown and Co, Boston.

12. Haggerty, PA; Rustein SO (1999) Breastfeeding and Complimentary Infant Feeding and the Postpartum Effects of Breastfeeding. Demographic and Health Surveys Comparative Studies Calverton, MA., Macro International.

13. Koletzo, B.; Hernell, O.; Michaelson, K. (2000) Short and Long Term Effects of Breastfeeding on Infant Health. Plemum Press, New York.

Course Outcomes

K2	CO1	Understand the Vulnerable sections of society
K3	CO2	Obtain in-depth knowledge on nutrition in pregnancy and lactation
K2	CO3	Understand the inter-relationship between nutrition and growth and development during infancy, pre-school and school going children.
K3	CO4	Familiarize the students with the multifaceted aspects of adolescents and adults
K1	CO5	Make the students competent for nutritional and health care of the elderly.

On successful completion of the course, the students will be able to gain knowledge about

Mapping of Cos with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**S**	**M**	**S**	**S**	**M**	**M**	**S**	**S**	**M**	**S**	M
CO2	**S**	**S**	**M**	**S**	**S**	**M**	**M**	**S**	**S**	**M**	**S**	M
CO3	**S**	**S**	**M**	**S**	**S**	**M**	**M**	**S**	**S**	**M**	**S**	M
CO4	**S**	**S**	**M**	**S**	**S**	**M**	**M**	**S**	**S**	**M**	**S**	M
CO5	**S**	**S**	**M**	**S**	**S**	**M**	**M**	**S**	**S**	**M**	**S**	M

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

Course Code & Title	**ADVANCED NUTRITION- I**		
PFNT32	**Semester-III**	**Credits:5**	**Hours:5**
Cognitive Level	**K1: Recall** **K2: Understand** **K5: Evaluate**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. The essential of nutrients in growth and development of humans 2. The importance of diet in maintaining human health and leading active lifestyle 3. The concept of diet therapy in treatment and management of nutritional disorders		

UNIT I

Human energy requirements:

Total energy expenditure-Basal Metabolic Rate, Physical activity, SDA

a. Components of energy requirements.

b. Factors affecting energy expenditure and requirements.

c. Factors affecting the thermal effect of food.

d. Factors affecting the energy expended in physical activity.

- Methods of estimation of energy expenditure and requirements.

Harris Benedict equation

- Energy excess and energy deficient in brief.

Carbohydrates

- Classification (available and unavailable), sources, digestion, absorption, metabolic utilization functions, and regulation of blood glucose concentration.

Dietary fiber:

- Classification of dietary fiber, physiological effects, potential health benefits, recommended intake and sources

UNIT II

Proteins

a. Functions, classification, sources, RDA, Digestion, absorption, utilization and storage,

b. Evaluation of protein quality.

c. Essential and non-essential amino acids, Amino acid balance, imbalance and toxicity,

UNIT III

Lipids

- Functions, classification, sources, RDA

-Digestion, absorption, utilization and storage.

- Transport and storage of fats in the body.

- Lipoproteins.

UNIT IV

Nutraceuticals and phytochemicals Natural occurrence of certain phytochemicals in foods, Antioxidants and flavonoids, omega-3 fatty acids, carotenoids, dietary fiber, phytoestrogens ; glucosinates; organo sulphur compounds.

Prebiotics and probiotics: Usefulness of probiotics and Prebiotics in gastro intestinal health and other benefits.

UNIT V

Definition, development of functional foods, use of bioactive compound in appropriate form with protective substances and activators, Development of biomarkers to indicate efficacy of functional ingredients; Research frontiers in functional foods.

REFERENCES

1. Shills, Me; Oslan, JA. Shike, M. and Ross, A.C. (editors) (1999) Modern Nutrition in Health and Disease (ninth edition), Williams and Williams. A Waverly Co.

2. Bamji, M.S. Rao, N.P. Reddy. V (editors) (2003) Textbook of Human Nutrition.2 nd Edition Oxford & IBH Publishing co. Pvt. Ltd. New Delhi.

3. WHO (1985) Energy & Protein requirements-report of joint FAO/WHO. UNO-expert consultation Technical report series 724 WHO, Geneva.

4. Ziegler, E.E. and Filer, Jr. L. J. (Des.) (1996). Present knowledge in nutrition. 7th edition. IISI Press. Washington DC.

5. Passmore, R. and Eastwood M.A. Human Nutrition and Dietetics EIBS/ Churchill Livingstone.

6. Swaminathan, M. Essentials of Foods and Nutrition, Vol 1. Fundamental Aspects, Vol II, Applied Aspects. The Bangalore Printing & Publishing Co. Ltd. Bangalore.

7. Jellife, D.B. The Assessment of the Nutritional status of the CommUNIT y. Monograph Series 53 WHO.

8. Gopal Das T. and Seshadri, S. Nutrition- Monitoring and Assessment- Oxford University Press, New Delhi.

9. Gopalan (Ed.) Recent Trends in Nutrition. Oxford University Press, New Delhi.

Periodicals

1. Nutrition Abstract & Rev.
2. Wld. Rev. Nutrition Diet.
3. Journal of Nutrition Education.
4. American Journal of Clinical Nutrition.
5. Journal of Biological Chemistry.
6. JAMA.
7. Journal of Chronical Diseases.
8. American Journal of Physiology.

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Understand the methods to determine body composition
K1	CO2	Aware of the current trends in the area of human nutrition requirements the methods of determining nutrient requirements and current figures of nutritional requirements.
K2	CO3	Know advances in the field of energy, carbohydrate, lipid and protein nutrition.
K5	CO4	Obtain facts on nutrients and its requirements.
K2	CO5	Gain knowledge on functional foods and its applications

Mapping of Cos with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	M	S	S	M	S	M
CO2	S	S	M	M	S	S	M	S	S	M	S	M
CO3	S	S	M	M	S	S	M	S	S	M	S	M
CO4	S	S	M	M	S	S	M	S	S	M	S	M
CO5	S	S	M	M	S	S	M	S	S	M	S	M

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

Course Code & Title	**ADVANCED DIETETICS**		
PFNT33	**Semester-III**	**Credits:5**	**Hours:5**
Cognitive Level	**K2: Understand** **K4: Analyze** **K6: Create**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. To intervene the metabolic anomalies of acute and chronic diseases. 2. To plan menu for various diseases based on their nutritional status and dietary needs.		

UNIT I

Techniques of feeding: Principle of Nutritional care, recent advances and techniques in feeding substrates. Types of hospital diets. Nutrition Support Techniques, Eneteral feeding - indications, Types - Nasogastric, Gastrostomy andJejumostomy - requirements and advantages. Parenteral feeding - Nutritional Support, Formula feeds and Complications in TPN.

Diet in Trauma and surgical conditions- Stress response, physiological response to surgery, pre and post operative nutritional care, Burns-complications, nutritional requirement and dietary management.

UNIT II

Diet in Energy Imbalance - Underweight and obesity, Etiology and dietary management.

Nutritional management of Diabetes mellitus : etiology, classification, metabolism, factors affecting normal blood sugar levels, diagnosis, signs and symptoms, types of insulin, glycemic index, oral hypoglycemic drugs, complications and prevention of diabetes.

UNIT III

Nutritional Management of GI tract Diseases and Disorders: Disorders, Etiology, Symptoms and dietary management of Acute gastritis, Chronic gastritis, Peptic ulcer - duodenal & gastric Intestinal disease - Flatulence, Diarrhoea and Dysentery, Constipation, Celiac disease, Tropical sprue, Irritable bowel syndrome, Diverticular disease, colon cancer, Ulcerative colitis.

Nutritional management of Liver, gall-bladder and pancreatic disorders: Liver disease - Hepatitis, cirrhosis, Jaundice, fatty liver, cholecystitscholelithiasis, Hepatic coma gall stones and Pancreatitis

UNIT IV

Nutritional management in Cardiovascular diseases and hypertension - prevalence, etiology- Dyslipidemia, atherosclerosis, angina pectoris, myocardial infarction, Ischemic heart disease, Prevention of CVD.

Hypertension - Classification, prevalence, Diet related factors influencing hypertension, Management of hypertension.

Nutritional Management of Cancer and AIDS - role of diet, metabolic effects and nutritional effects.

UNIT V

Diseases of the Kidney - Etiology, Symptoms and Dietary modification, Nephritis, Nephrosis, Acute and chronic renal failure, End Stage Renal Disease (ESRD), Renal calculi.

Transplantation and dialysis, Dietary Modification.

Diet and Drug Interaction: effects of drugs on food and nutrient intake – ingestion, digestion, absorption, metabolism and requirements.

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1. Mahan, L.K. and Escott-Stump, S.(2000): Krauses Food Nutrition and Diet Therapy,11th edition, W.B.Saunders Ltd.

2. Shils,M.E, Olson, J.A, Shike, M. and Ross, A.C.(1999): Modern Nutrition in Health and Disease 9th edition. Williams and Wilkins.

3. Escott-Stump S(1998): Nutrition and Diagnosis Related Care 4th edition. Williams and Wilkins.

4. Garrow, J.S., James, W.P.T and Ralph A.(2000): Human Nutrition and dietetics, 10th edition, Churchill Livingstone.

5. Williams, S.R.(1993): Nutrition and Diet Therapy 7th edition. Times Mirror/ Mosby College Publishing.

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12. Robinson C.H and Lawler M.E.et alNormal and Therapeutic Nutrition.17th edition Mac Millan Pub Co1986.

13. Williams S.R Nutrition and Diet Therapy C.V Mosloy Co 1973.

14. Antia F.P. Clinical Dietetics and Nutrition 3rd edition, Oxford University Press, Bombay 1989.

15. Beaton G.H. and Bengoa J.M. Eds. WHO Monograph Series 62 1976.

16. FAO, WHO Monograph and Technical Series.

17. Davidson, A. Passmore, R. Brock J.F. and Truewell, A.S. Human Nutrition and Dietetics. English language Book Society and Churchill Livingstone 1975.

18. Srilakshmi S. Dietetics 1999.

19. WHO(1995) Diabetes Mellitus WHO Technical Report Series (Geneva)

Journals

1. Indian Journal of Nutrition and Dietetics.
2. Journal of Dietetic American Association.
3. Nutrition Update Series.
4. American Journal of Clinical Nutrition
5. European Journal of Clinical Nutrition
6. Nutritional Reviews
7. World Review of Nutrition and Dietetics
8. Journal of Applied Nutrition
9. WHO Expert Committee.

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Understand the etiology, physiology and metabolic anomalies of acute and chronic diseases and patient needs.
K4	CO2	Analyze the effect of the various diseases on nutritional and dietary requirements.
K6	CO3	Be able to recommend and provide appropriate nutritional care for prevention and treatment of gastro intestinal diseases
K2	CO4	Gain knowledge on nutritional management in cardiovascular diseases and hypertension
K2	CO5	Acquire knowledge on renal diseases and drug and nutrient interactions.

Mapping of Cos with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	M	S	S	S	S	M
CO2	S	S	S	S	M	S	M	S	S	S	S	M
CO3	S	S	S	S	M	S	M	S	S	S	S	M
CO4	S	S	S	S	M	S	M	S	S	S	S	M
CO5	S	S	S	S	M	S	M	S	S	S	S	M

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

Course Code & Title	**FOOD PROCESSING**		
PFNE33	**Semester-III**	**Credits:5**	**Hours:5**
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. To Knowledgeable about the applications of preservation 2. To make out the different preservation process		

UNIT I

Basic requirements in general for a food processing unit.

Principle underlying food processing operations, Physical means in food processing operation(including thermal, radiation, refrigeration, freezing, & dehydration) Chemical means in food processing(by sugar , salt, curing, smoke, acids,& Chemicals, Effect of processing on physicochemical characteristics.

Use of class II preservatives.

UNIT II

Processing Technology for preservation and production of variety food products. Processing of cereals, legumes, oilseeds, fruits and vegetables.

UNIT-III

Processing Technology for milk and milk products. Indigenous milk products pannier and yoghurt.

UNIT-IV

Brief manufacturing process of coffee, tea, cocoa, ready to serve beverages.

UNIT -V

Technologies underlyingin enrichment, fortification, fermentation, malting, germination.

REFERENCES

1. Bower, Jane, Food theory and applications, Mac Millan publishing company.1992
2. Potter, N.N. & Hotchkiss, J.H., Food Science, CBS publishers & Distributors New Delhi. 1996
3. Pomerange, Y., Functional properties of food components, Academic press, INC. 1991
4. Early, R., The technology of dairy products, VCH publishers, INC.
5. Belitz, H.D. and Grosch, W. (1999) Food Chemistry. Springer – Verlag, Berlin Heidelberg
6. Damodaran, S. and Parot, A (1997) Food Proteins and their Applications. Marcel Dekker Inc
7. Davis, M.B., Austin, J. and Partridge, D.A. (1991) Vitamin C: Its Chemistry and Biochemistry. The Royal Society of Chemistry T.G. House, Science Park, Cambridge CB4 4WF
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11. Gunasekaran, S. (ed)(2001) Nondestructive Food Evaluation Marcel Dekker Inc, New York.
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13. O'Brien, L.O., Nabors and Gelardi, R.C. (1991) Alternative Sweeteners. Marcel Dekker, New York
14. Risch, S.J. and Hotchkiss, J.H. (ed)(1991) Food Packaging Interactions II. ACS Symposium Series 473, American Chemical Society, Washington D.C.
15. Marhawa, S.S. and Arora, J.K. (2000) Food Processing: Biotechnological Applications Asiatech Publishers Inc, New Delhi

16. Mahindru, S.N. (2000) Food Safety – A Techno-legal Analysis. Tata McGraw Hill Publishing Co Ltd., New Delhi

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Understand the importance and methods of post-harvest conservation of foods.
K1	CO2	Gain knowledge in food processing. technology for preservation and production
K3	CO3	Learn various food processing techniques and its recent developments in milk processing
K2	CO4	Gain knowledge on various food processing technology and its applications in beverages
K2	CO5	Acquire knowledge on food fortification and enrichment in fermentation techniques

Mapping of Cos with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	S	S	S	M	M	S	S
CO2	S	M	S	S	M	S	S	S	M	M	S	S
CO3	S	M	S	S	M	S	S	S	M	M	S	S
CO4	S	M	S	S	M	S	S	S	M	M	S	S
CO5	S	M	S	S	M	S	S	S	M	M	S	S

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code & Title	**PRACTICAL III -THERAPUTIC NUTRITION**		
PFNP33	**Semester-III**	**Credits:5**	**Hours:5**
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply** **K5: Evaluate** **K6: Create**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. The students will be able to plan a day's menu based on the person/ patients disease condition. 2. The students will be able to prepare nutritious/ hospital/ paediatric diet.		

UNIT-I

Types of diet - Full liquid, clear liquid, soft, light, bland and regular diet.Diet for - obesity, underweight.

UNIT-II

Diet in gastro intestinal disorders - peptic ulcer, pancreatitis diarrhea, constipation. Diet in liver disorders - jaundice, cirrhosis, hepatic coma, fatty liver and gall stones.

UNIT-III

Diet in kidney disorders - Glomerulo nephritis, nephrotic syndrome, renal failure,

Diet in Diabetes mellitus –type 1, type 2, GDM.

UNIT-IV

Diet in Cardio vascular disease - Hypertension, atherosclerosis, congestive heart failure.

UNIT-V

Preparation of Diet Counseling aids for common disorders. Dietary counseling of the patients. Nutritional assessment of pediatrics and adults by IAP, SGA.

REFERENCES

1. Mahan, L.K. and Escott-Stump, S.(2000): Krauses Food Nutrition and Diet Therapy,11th edition, W.B.Saunders Ltd.

2. Shils,M.E, Olson, J.A, Shike, M. and Ross, A.C.(1999): Modern Nutrition in Health and Disease 9th edition. Williams and Wilkins.

3. Escott-Stump S(1998): Nutrition and Diagnosis Related Care 4th edition. Williams and Wilkins.

4. Garrow, J.S., James, W.P.T and Ralph A.(2000): Human Nutrition and dietetics, 10th edition, Churchill Livingstone.

5. Williams, S.R.(1993): Nutrition and Diet Therapy 7th edition. Times Mirror/ Mosby College Publishing.

6. Davis, J. and Sheer, K.(1994): Applied Nutrition and Diet Therapy.

7. Walker, W.A. and Watkins, J.B (1985): Nutrition in Pediatrics, Boston, Little, Brown and Co.

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K1	CO1	Learn various disorders and its complications
K6	CO2	Create different types of therapeutic diet.
K3	CO3	Apply the dietary measures to reduce/prevent the disease.
K5	CO4	Evaluate the hands on experience in therapeutic nutrition and its planning.
K2	CO5	Learn the diet counseling process

Mapping of Cos with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	S	M	S	S	S

CO2	**S**	**S**	**M**	**S**	**S**	**S**	**M**	**S**	**M**	**S**	**S**	**S**
CO3	**S**	**S**	**M**	**S**	**S**	**S**	**M**	**S**	**M**	**S**	**S**	**S**
CO4	**S**	**S**	**M**	**S**	**S**	**S**	**M**	**S**	**M**	**S**	**S**	**S**
CO5	**S**	**S**	**M**	**S**	**S**	**S**	**M**	**S**	**M**	**S**	**S**	**S**

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

Course Code & Title	**ADVANCED NUTRITION II**		
PFNT41	**Semester-IV**	**Credits:5**	**Hours:5**
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. The role and importance of nutrition management in exercise and sport performance 2. The coping mechanism of human body during high altitude and sea traveland nutrition management during emergencies		

UNIT I

Vitamins: Fat soluble vitamins-A, D, E, K- Chemistry, Functions, Physiological action, Digestion, Absorption, Utilization, Transport, Storage, Excretion, Source, RDA, Deficiency, Diagnosis of deficiency, Toxicity, Interaction of fat soluble vitamins with other nutrients. Hypo and hyper vitaminosis.

UNIT II

Vitamins: Water soluble vitamins: Vitamin C, Thiamine, Riboflavin, Niacin, Pyridoxine (B6), Folic acid, Cynocobalamin (B12), Biotin: Chemistry, Functions, Physiological action, Digestion, Absorption, Utilization, Transport, Storage, Excretion, Source, RDA, Deficiency, Diagnosis of deficiency, Toxicity, Interaction of fat soluble vitamins with other nutrients.

UNIT III

Minerals (macro minerals): Calcium, Phosphorous, Magnesium, Sodium, Potassium, Chloride: Distribution in the body, digestion, absorption, Utilization, transport, excretion, deficiency, toxicity, sources, RDA, Regulation of calcium concentration.

UNIT IV

Minerals (Micro minerals): Iron, Zinc, Copper, Selenium, Chromium, Manganese, Iodine, Fluorine. Distribution in the body, digestion, absorption, Utilization, transport, excretion, deficiency, toxicity, sources, RDA.

UNIT V

6. Antioxidants and Free Radicals:

Role of vitamins and minerals as antioxidants

Role of oxygen free radicals.

REFERENCES

1. Shills, Me; Oslan, JA. Shike, M. and Ross, A.C. (editors) (1999) Modern Nutrition in Health and Disease (ninth edition), Williams and Williams. A Waverly Co.

2. Bamji, M.S. Rao, N.P. Reddy. V (editors) (2003) Textbook of Human Nutrition. 2 nd Edition Oxford & IBH Publishing co. Pvt. Ltd. New Delhi.

3. WHO (1985) Energy & Protein requirements-report of joint FAO/WHO. UNO-expert consultation Technical report series 724 WHO, Geneva.

4. Ziegler, E.E. and Filer, Jr. L. J. (Des.) (1996). Present knowledge in nutrition. 7th edition. IISI Press. Washington DC.

5. Passmore, R. and Eastwood M.A. Human Nutrition and Dietetics EIBS/ Churchill Livingstone.

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8. Gopal Das T. and Seshadri, S. Nutrition- Monitoring and Assessment- Oxford University Press, New Delhi.

9. Gopalan (Ed.) Recent Trends in Nutrition. Oxford University Press, New Delhi.

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K1	CO1	Know recent developments in the field of vitamins and minerals.
K2	CO2	Learn the importance of vitamins and minerals in relation to other nutrients.
K2	CO3	Understand Food components other than essential nutrients
K3	CO4	Analyze the information on the potential health implication and mechanisms of action of functional foods
K3	CO5	.Gain the role of antioxidants in our health

Mapping of Cos with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	S	S	M	S	M	S	S	M
CO2	S	M	M	S	S	S	M	S	M	S	S	M
CO3	S	M	M	S	S	S	M	S	M	S	S	M
CO4	S	M	M	S	S	S	M	S	M	S	S	M
CO5	S	M	M	S	S	S	M	S	M	S	S	M

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

Course Code & Title	NUTRACEUTICALS AND FUNCTIONAL FOODS		
PFNT42	**Semester-IV**	**Credits:5**	**Hours:5**
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply**		
Learning Objectives	**The Course aims to** On successful completion of this course the student will be able to: 1. Knowledgeable about specific issues concerning functional foods and nutraceuticals 2. Understanding the use of various functional foods in therapeutic conditions 3. To develop diet supplements incorporating functional foods 4. Practicing the effect of each food and its effect on health		

UNIT – I

Functional foods and Nutraceuticals – Introduction – Defining, the concept – Review of the history of functional foods – technology of Nutraceuticals – primary and secondary metabolites in plants general teleology – a) Carotenoids b) Conjugated linolenic acid c) Flavonoids d) Nitrogen and Sulphur containing Amino acid derivatives e) proteinase and alpha amylase inhibitors f) Omega – 3 PUFA g) Terpenoids.

UNIT – II

Classifying Nutraceuticals Organizational models for Nutraceuticals

a) Food source – Plant: Soya, olive oil, plant steroid, tea, grape vine, garlic, capsicum, dietary fibre and other fruits.

b) Animal: Milk and products, meat, fish. Microbial probiotics.

c) Mechanism of action – Anticancer, positive influence on blood lipid profile, anti oxidation, anti inflammatory, osteogenetic

d) Chemical nature – Isoprenoid derivatives, phenolic substances, fatty acids and structural lipids, carbohydrates and derivatives, amino acid base substances, microbes, minerals.

UNIT — III

Regulation of dietary supplements – Types – in born errors of metabolism, - obesity, neurological disorder, diabetes mellitus, hypertension vitamin A deficiency, PEM Instant foods and formulas supplement soups, Herbal and functional food beverages and sports.

UNIT — IV

Measurement of functional component and their bioavailability. Need for measurement, safety quality assurance and cost — bioavailability: definition, factor affecting, chemical measurement and physical testing and microbiological testing- functional foods and vitro studies.

UNIT — V

Pharmacology and Nutraceuticals — pharmacology of chemical components .derived form plant source and the therapeutic derived from plant source and the therapeutic efficiency of functional food ingredients — nutragenomics— Relationship between nutritional supplementation and gene expression and disease prevention.

Dietary supplements

REFERENCES:

1. Mary, K. Schmidl and Theodre, P. Labuza (2000), Essentials of Functional Foods, Culinary and hospitality industry publication services

2. Israel Goldberg (2001), Functional foods, pharma foods, Nutraceuticals, Culinary and hospitality industry publication services.

3. Robert easy Wildman (2001), Handbook of Nutracenticals and functional foods, Culinary and hospitality industry publication services.

4. Paresh, C. Dutta (2004), Phytosterols as Functional Food Components and Nutraceticals, Marcel Dekker Inc, New York.

5. Chatwick, R etal (2003), Functional Foods., Springer. 7. Jeffery Horst (2002), Methods of Analysis for Functional Foods and Nutraceuticals, CRS press.

Course Outcomes:

On successful completion of the course, the students will be able to gain knowledge about

K1	CO1	Aware of the growing the important of Nutraceuticals and functional foods
K2	CO2	Enrich about role of functional foods in health
K2	CO3	Know the commercial food supplements and its occupation in market
K3	CO4	Learn the functional assessment of foods
K2	CO5	Enrich knowledge on Nutraceuticals and functional foods on health.

Mapping of Cos with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	S	S	M	M	S	S
CO2	S	M	S	S	M	M	S	S	M	M	S	S
CO3	S	M	S	S	M	M	S	S	M	M	S	S
CO4	S	M	S	S	M	M	S	S	M	M	S	S
CO5	S	M	S	S	M	M	S	S	M	M	S	S

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

DISSERTATION

PFND41 **6Hours / Credits 5**

The dissertation should be based on individual studies and carry the following format:

Preliminary

1. Title page- title, authors name
2. Certificate of originality by the guide
3. Declaration by the author
4. Table of contents
5. List of tables
6. List of figures
7. Acknowledgement
8. Abstract

I. Introduction: Statement of the problem, significance, need for the study, objectives, and definitions.
II. Review of literature
III. Methodology: tools used, procedures, hypothesis.
IV. Results and discussion: tables and figures, statistical presentations, hypothesis testing.
V. Summary and conclusion
VI. Suggestion for the future study
VII. References

Courses having focus on employability/entrepreneurship/ skill development			
Name of the Course	Course Code	Year of introduction	Activities with direct bearing on Employability/ Entrepreneurship/ Skill development
Research methodology and statistics	PFNT11	2018	Data analysis in food analysis laboratory
Human Physiology	PFNT12	2018	Fitness trainer
Advanced Food Science	PFNT13	2018	Entrepreneur of food products
Fundamentals of food technology	PFNE 11	2018	Quality checker in food processing unit
Advanced Food Science practical	PFNP11	2018	Quality analyzer in food laboratory
Food microbiology	PFNT 21	2018	Food analysist
Community nutrition	PFNT22	2018	Child Development Project Officer
Nutritional biochemistry	PFNT23	2018	Clinical nutritionist in hospitals
Home Science Composite	PFNE22	2018	Nutritionist in National nutrition bodies
Public health nutrition practical	PFNP22	2018	Community nutritionist, child development project officer
Nutrition through life cycle	PFNT31	2018	Nutrition consultant
Advanced Dietetics	PFNT33	2018	Dietetician in hospitals
Advanced Nutrition-1	PFNT32	2018	Nutritionist
Food processing	PFNE33	2018	Food technologist
Practical-III Therapeutic nutrition	PFNP33	2018	Dietetician in hospitals
Advanced Nutrition-II	PFNT41	2018	Nutritionist
Nutraceuticals and functional foods	PFNT42	2018	Nutritionist
Dissertation	PFND41	2018	Research Associate in Food and Nutrition research agencies