

**Syllabus  
Of  
Master of Art (Home Science)  
Contents w.e.f. Session 2022-2024**



**M.A/M.Sc. FOOD AND NUTRITION  
Department of Home Science  
Jananayak Chandrashekhar University  
Ballia, UP-227301**

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## **Introduction :**

- 1) The courses in Foods and Nutrition aim at capacity building of students to manage long and short-term intervention within reach of family and community to achieve food and nutrition security.
- 2) The courses designed will enable students to understand global nutritional problems, current trends in nutrition and food challenges in next millenium and inculcate skill in planning, managing and executing nutrition projects for affected community.
- 3) The new PG courses planned includes food analysis, processing, nutrition for physical fitness, immunity and special conditions, food toxicology, advanced nutrients, nutrition and agriculture interface to achieve the livelihood security and longevity.
- 4) The course programme will enable students to understand the nutritional management in natural calamities.
- 5) The courses will enable the students to manage diet during various communicable and non-communicable diseases for faster recovery.
- 6) The courses designed will develop competency to plan and prepare designer foods as per the requirement of group/community and to take it as entrepreneur.

## **Vision:**

The Department of Food and Nutrition at Jananayak Chandrashekhar University, Ballia endeavours to achieve excellence in teaching and research for outreach to the community, industry and institutions to ensure promotive health for all.

## **Mission:**

The Department of Food and Nutrition strives to achieve academic excellence in the field of nutrition research and development. The aim is to train a cadre of professionals who work as teachers, researchers, public health nutritionists, dietitians, nutrition consultants, food quality control officers and experts in development of innovative food products. The larger objective is creation of nutrition awareness through community outreach for promotion of healthy lifestyle among the population.

  


### Semester I

S.No	Course Code	Name of Course	Credit	Marks
1	HSFN101 Paper - I	Research Method and Statistics	5	100
2	HSFN102 Paper - II	Statistics and Computer Applications	5	100
3	HSFN103 Paper - III	Advanced Nutrition	5	100
4	HSFN104 Paper - IV	Applied Physiology	5	100
5	HSFNP105 Paper - V	Practical Related to Theory Papers	4	100
6	HSFN106 Paper - VI	One Minor Elective Paper (For Students of other faculty) (I or II Sem)	4	100
<b>Total Credit</b>			28	

### Semester II

S.No	Course Code	Name of Course	Credit	Marks
1	HSFN201 Paper - I	Problems in Human Nutrition	5	100
2	HSFN202 Paper - II	Clinical and Therapeutic Nutrition	5	100
3	HSFN203 Paper - III	Maternal and Child Nutrition	5	100
4	HSFN204 Paper - IV	Nutrition and Health of Women	5	100
5	HSFNP205 Paper - V	Practical Related to Theory Papers	4	100
6	HSFN206 Paper - VI	Elective Paper (I or II Sem)		
<b>Total Credit</b>			24	

### Semester III

S.No	Course Code	Name of Course	Credit	Marks
1	HSFN301 Paper - I	Public Nutrition	5	100
2	HSFN302 Paper - II	Nutrition for Health and Fitness	5	100
3	HSFN303 Paper - III	Assessment of Nutrition Status	5	100
4	HSFN304 Paper - IV	Improving Health and Nutrition	5	100
5	HSFNP305 Paper - V	Practical Related to Theory Papers	4	100
<b>Total Credit</b>			24	

### Semester IV

S.No	Course Code	Name of Course	Credit	Marks
1	HSFN401 Paper - I	Management of Nutrition Programmes	5	100
2	HSFN402 Paper - II	Institutional Food Administration	5	100
3	HSFN403 Paper - III	Food Safety and Quality Control	5	100
4	HSFND404 Paper - IV	Dissertation/Project work	5	100
5	HSFNP405 Paper - V	Practical Related to Theory papers	4	100
<b>Total Credit</b>			24	

  


**Optional/Elective courses for Semester IV (Choose One elective paper)**

<b>S.No</b>	<b>Course Code</b>	<b>Name of Course</b>	<b>Credit</b>	<b>Marks</b>
<b>1</b>	HSFNEC501 ,Paper- Elective Course- I	Advanced Food Science	4	100
<b>2</b>	HSFNEC502 ,Paper- Elective Course- II	Nutrition Communication and Diet Counseling	4	100
<b>3</b>	HSFNEC503 ,Paper- Elective Course- III	Applied Food Microbiology	4	100
<b>4</b>	HSFNEC504, Paper- Elective Course- IV	Food Processing Technology	4	100
<b>5</b>	HSFNEC505 Paper- Elective Course- V	Nutrition for Fitness and Sports	4	100

 

**Programme Name and Code-** Semester I , Paper - I

**Course Name and Code-** Research Method and Statistics , HSFN101

**Objectives:**

- 1.To understand the significance of statistics and research methodology in Home Science research
2. To understand the types, tools methods of research and develop the ability to construct data gathering instruments appropriate to the research design.
- 3.To understand and apply the appropriate statistical technique for the measurement scale and design.

S.No	
	<b>Unit -1</b>
1a1b	<b>Science, scientific methods, scientific approach.</b> <b>Role of statistics and research in Home Science discipline. Objectives of research:</b> Explanation, control and prediction. <b>Types of Research:</b> Historical, descriptive, experimental, case study, social research, participatory research.
	<b>Unit-2</b>
2a2b	<b>Definition and Identification of a Research Problem.</b> <b>Hypothesis:</b> Concept, Types & Significance <b>Types of variables Theory of probability –</b> Population and sample – <b>Probability sampling:</b> simple random, systematic random sampling, two stages and multi stage sampling, cluster sampling. – <b>Non-Probability sampling:</b> purposive, quota and volunteer sampling/snowball sampling.
	<b>Unit -3</b>
3a	<b>Research Design:</b> Concept, Types and significance. <b>Sources of Data Collection:</b> Primary and Secondary, Field and Documentary. <b>Tools of Data Collection:</b> Interview , observation and questionnaire. <b>Methods of data</b>
3b	<b>Collection:</b> Interview, Questionnaire, Observation, Case Study ,Scaling methods, Home visit , Group discussions
	<b>Unit-4</b>
4a	<b>Measurement and Scaling.</b>
4b	<b>Critical analysis of research. Writing a research proposal.</b> <b>Analysis of data and research report.</b>

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## Course Learning Outcomes:

Student will be able to –

1. Demonstrate knowledge of the scientific method, purpose and approaches to research.
2. Compare and contrast quantitative and qualitative research .
3. Explain research design and the research cycle.
4. Prepare key elements of a research proposal.

## REFERENCES

1. Aschengrau A, Seage III GR. (2014) Essentials of Epidemiology in Public Health. (Third Edition). Sudbury, MA: Jones & Bartlett
2. Creswell, J. W. (2009). Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks, CA: Sage Publications.
3. Bryman, A. (2008). Social research method. Oxford: Oxford University Press.
4. Bhandarkar, P.L. and Willkinson, T.S. Methodology and Techniques of Social Research, Himalaya Pub. House, Mumbai, 2000.
5. Bhatnagar, G.L. Research methods and measurement in behavioural and social science, Agri. Cole Publishing Academy, New Delhi, 1990.
6. Mukherjee, R. The quality of Life: valuation in social research, Sage Pub., New Delhi, 1989.

## Teaching Plan:

**Week 1:** Definition, objectives and significance of research.

**Week 2 :**Types of research, Scientific method: induction and deduction.

**Week 3 :** Research approaches: quantitative, qualitative and mixed. Issues of relevance and cultural appropriateness.

**Week 4:** Meaning and need of research design; types of research design, issues in design construction

**Week 5:** Concept of sampling, key differences in the two approaches.

**Week 6:** Sampling methods, Sample size and sampling error.

**Week 7:** Measurement in research, scales and errors in measurement , reliability and validity of measurement tools.

**Week 8:** Methods of data collection and types of data.

**Week 9:** Data management and quality control; Transcription in qualitative data analyses.

**Week 10:** Errors in inference – Bias and confounding, reliability and validity issues; Ensi and validity in qualitative research.



**Week 11:** Research Cycle and writing research report.

**Week 12:** Ethics in Research.

**Facilitating the achievement of Course Learning Outcomes:**

<b>Unit No.</b>	<b>Course Learning Outcomes</b>	<b>Teaching and Learning Activity</b>	<b>Assessment Tasks</b>
<b>1</b>	Demonstrate knowledge of the scientific method, purpose and approaches to	Lectures, Class discussions ,power point presentations,	Assignments, Open booktest
<b>2</b>	Compare and contrast quantitative and qualitative research	Lectures,power point presentations and classroom discussion	Assignment ,Quizzes and objective test
<b>3</b>	Explain research design and the	Lectures,power point	Assignments, Open book
	research cycle	presentations and classroom discussion using research case studies	test
<b>4</b>	Prepare key elements of a research proposal	Lectures,power point presentations ,Students to develop a live research project in groups	Assignments, Open book test Assessment of live project

 

**Programme Name and Code-** Semester I , Paper - II

**Course Name and Code-** Statistics and Computer Applications , HSFN102

**Objectives:**

- 1.To understand the role of statistics and computer applications in research.
- 2.To apply statistical techniques to research data for analyzing and interpreting data meaningfully.

S.No	
	<b>Unit-1</b>
<b>1a</b>	<b>Statistics:</b> Meaning, Uses and Diagrammatic representation of Data
<b>1b</b>	Measures of Central Tendency Measures of Dispersion
	<b>Unit-2</b>
<b>2a</b>	<b>Correlation:</b> Karl Pearson's Rank Correction Coefficient <b>Index Number</b>
<b>2b</b>	<b>Probability:</b> Concept and Theory Chi Square "t" test
	<b>Unit-3</b>
<b>3a</b>	<b>Fundamentals of Computer:</b> History of Computers, Generation of Computer, Language, Components,
<b>3b</b>	<b>Applications of Computers.</b> Operating System & Internet: MS-DOS, MS-Windows, and Internet
	<b>Unit-4</b>
<b>4a</b>	<b>MS-Office:</b> MS-Word, MS Excel, and Power Point.
<b>4b</b>	<b>Introduction to Data Base Management Systems</b>

**Course Learning Outcomes :**

Student will be able to

1. Differentiate between the qualitative and quantitative methods of analysis of data.
2. Suitably apply data reduction strategies and illustrate data using various graphical methods.
3. Use appropriate parametric and non parametric statistical tests .
4. Draw conclusions and interpretations from the analysis of data using various statistical softwares.

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## REFERENCES

- 1- Gordis L. (2013) Epidemiology. (Fifth Edition). Philadelphia, PA: Saunders Elsevier,
- 2- Agresti, A.& Franklin C.A. (2009) Statistics: The Art and Science of Learning from Data ( Second Edition) Boston,MA: Pearson Prentice Hall, ISBN 978-0-13-513199-2
- 3- Greene, S. and Hogan, D. (Eds.). (2005). Researching Children's Experiences: Methods and Approaches. London: Sage.
- 4- Muijs, D. (2004). Doing Quantitative Research in Education with SPSS. London: Sage

### Teaching plan:

**Week 1:** Basic principles and concepts in statistics, Orientation to qualitative and quantitative research procedures, Scales of measurement, Reliability and validity

**Week 2:** Qualitative and quantitative data- Coding and data reduction strategies, Organisation of Data: Frequency distributions vs. thematic analysis

**Week 3:** Percentage, percentile ranking and frequencies, Univariate, bivariate and multivariate tables

**Week 4:** Graphic representation: Graphs, diagrams and charts, Applications of descriptive statistics

**Week 5:** Measures of Central tendency and Variability

**Week 6:** Basic principles and applications of probability ,Normal curve

**Week 7:** Characteristics of distributions

**Week 8:** History of Computers, Generation of Computer, Language, Components, Applications of Computers.

**Week 9:** MS-Word, MS Excel, and Power Point.

**Week 10:** Introduction to Data Base Management Systems.

### Facilitating the achievement of Course Learning Outcomes:

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understand the basic concepts, theories and methods in statistics and Differentiate between the qualitative and quantitative methods of analysis of data	Lectures, power point presentations and classroom discussion	Assignments, Open book test
2	Suitably apply data reduction strategies and illustrate data using various graphical methods	Lectures, power point presentations and classroom discussion	Quizzes and objective test
3	History of Computers, Generation of Computer, Language, Components, Applications of Computers.	Lectures, power point presentations and classroom discussion	Class assignments and quizzes
4	MS-Word, MS Excel, and PowerPoint. Introduction to Data Base Management Systems	Lectures, power point presentations and classroom discussion.	Assessment of live project

**Programme Name and Code-** Semester I , Paper -III

**Course Name and Code-** Advanced Nutrition , HSFN103

**Objectives :** To familiarize the students with new developments in the area of energy metabolism and its relation to human health. Enable the students to understand the current trends in nutrition, functions, deficiencies and toxicity of different nutrients and acquaint about nutritional requirement in special conditions. To acquaint the students with recent developments in the role of carbohydrates, proteins and lipids in normal and diseased conditions..

1. To understand the importance of enrichment of food .
2. Provide in-depth knowledge of the physiological and metabolic role of various nutrients and their interactions in human nutrition.
3. Enable students to understand the basis of human nutritional requirements and recommendations through the life cycle.
4. Enable students to understand the pharmacological actions of nutrients and their implications.
5. Familiarise students with the recent advances in nutrition.

S.No	
	<b>Unit-1</b>
<b>1a</b>	<b>Different food groups and their nutritive value.</b> <b>Energy in Human Nutrition:</b> Energy Balance; Assessment of Energy Requirements; Deficiency and Excess.
<b>1b</b>	<b>Carbohydrates:</b> Classification, Digestion; absorption and metabolism (Glycolysis, Gluconeogenesis, Citric Acid Cycle); Regulation of Blood Sugar; Glycolic Index of Foods; Dietary Fibre;
	Composition, Properties and Nutritional Significance.
	<b>Unit-2</b>
<b>2a</b>	<b>Proteins:</b> Classification, digestion, absorption and metabolism (Transamination and diminution of amino acids), Urea Cycle; Protein and amino acid requirements
<b>2b</b>	<b>Lipids:</b> Classification digestion, absorption, transport-review. Functions of EFA. Role of n-3, n-6 fatty acids in health and disease. Requirements of total fat and fatty acids. Trans fatty acids. Prostaglandins.

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	<b>Unit-3</b>
<b>3a</b>	<b>Vitamins:</b> Sources, requirements, bio-chemical functions, deficiency and toxicity.
<b>3b</b>	<b>Minerals:</b> Bioavailability, requirements, functions, deficiency and toxicity. <b>Water:</b> Regulation of intra and extra cellular volume. Osmolality, water balance and its regulation.
	<b>Unit -4</b>
<b>4a</b>	<b>Non-nutritive food components with potential health effects:</b> Polyphenols, tannins, phytate, phytoestrogens, cyanogenic compounds, lectins and saponins.
<b>4b</b>	<b>Nutritional regulation of gene expression.</b> <b>Nutrition management in special conditions:</b> Space travel, high altitudes, low temperatures, submarines.

**Course Learning Outcomes :**

After completing this course, the student will be able to:

1. Assess nutritional status of individuals and groups.
2. Measure energy expenditure in individuals
3. Assess the Carbohydrates ,Protein, Vitamins etc quality of diets and dishes.




## References

1. Shils, M.E.: Olson, J.:Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9<sup>th</sup> edition Williams and Williams, A Beverly co, London.
2. Indian Council of Medical Research. Recommended Dietary intakes for Indians Latest Recommendations.
3. Baeurle, P.A. (ed) (1994) Inducible Gene Expression. Part I: Environmental Stresses and Nutrients. Boston: Birkhauser

## Journals

1. Nutrition Reviews
2. Journal of Nutrition
3. American Journal of Clinical Nutrition
4. British Journal of Nutrition
5. European Journal of Clinical Nutrition
6. International Journal of Vitamin and Nutrition Research
7. International Journal of Food Science and Nutrition
8. Nutrition Research
9. Ann Nutr Metab

## Teaching plan:

**Week 1:** Different food groups and their nutritive value.

**Week 2:** Energy Balance; Assessment of Energy Requirements; Deficiency and Excess.

**Week 3:** Classification, Digestion; absorption and metabolism of Carbohydrates.

**Week 4:** Classification, Digestion; absorption and metabolism of Proteins.

**Week 5:** Classification, Digestion; absorption and metabolism of Lipids. Functions of EFA

**Week 6:** Sources, requirements, bio-chemical functions, deficiency and toxicity Vitamins(A,B,C,D,E,K).

**Week 7:** Derivation of requirements of calcium, selenium, iron, magnesium

**Week 8:** Derivation of requirements of ,zinc, iodine, sodium, potassium, pyridoxine, other trace minerals.

**Week 9:** Regulation of intra and extra cellular volume of Water.

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**Week 10:** Non-nutritive food components with potential health effects-Polyphenols, tannins, phytate, phytoestrogens, cyanogenic compounds, lectins and saponins.

**Week 11:** Nutritional regulation of gene expression.

**Week 12:** Nutrition management in special conditions- Space travel, high altitudes, low temperatures, submarines.

**Facilitating the achievement of Course Learning Outcomes:**

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Different food groups and their nutritive value. Energy Balance; Assessment of Energy Requirements; Deficiency and Excess. Classification, Digestion; absorption and metabolism of Carbohydrates.	Lectures, Class discussions	Assignment ,Student Presentations /Class Quiz ,Chart, Poster, Flash card , Practical
2	Classification, Digestion; absorption and metabolism of Proteins. Classification, Digestion; absorption and metabolism of Lipids. Functions of EFA.	Lectures, Class discussions	Assignment ,Student Presentations /Class Quiz ,Chart, Poster, Practical
3	Sources, requirements, bio-chemical functions, deficiency and toxicity Vitamins(A,B,C,D,E,K). Derivation of requirements of calcium, selenium, iron, magnesium ,zinc, iodine, sodium, potassium, pyridoxine, other trace minerals. Water: Regulation of intra and extra cellular volume. Osmolality, water balance and its regulation.	Lectures, Class discussions	Assignment ,Student Presentations /Class Quiz ,Chart, Poster, Models, Practical
4	Understand nutritional management in special conditions	Reading of research on sports nutrition and derivation of nutrient requirements in special conditions, discussion of findings, Power Point presentations, videos of space food systems	Assignment ,Student Presentations /Class Quiz ,Chart, Poster, Models , Practical

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**Programme Name and Code-** Semester I , Paper -IV

**Course Name and Code-** Applied Physiology, HSFN104

**Objectives :**

1. Advance their understanding of some of the relevant issues and topics of human physiology.
- 2.Enable the students to understand the integrated function of all system and the grounding of nutritional science in physiology.
- 3.To enable the students to understand the anatomy and functions of human body and techniques/methods of blood and urine analysis.
4. Understand alterations of structure and function in various organs and systems in disease conditions.

S.No	
	<b>Unit- 1</b>
<b>1a</b>	<b>Cell structure and function Levels of cellular organization and function-</b> organelles, tissues and systems Brief review. Cell membrane,transport across cell membrane and intercellular communication. Regulation of cell multiplication.
<b>1b</b>	<b>Nervous System</b> - Review of structure and function of neuron, conduction of nerve impulse synapses and role of neurotransmitters. -Organisation of central nervous system, structure and function of Brain and spinal cord, Afferent and efferent nerves. Blood Brain Barrier, CSF, Hypothalamus and its role in various body function- obesity, sleep, memor
<b>1c</b>	<b>Endocrine system</b> - Endocrine glands- structure, function, role of hormones, regulation of hormonal secretion. The neuro endocrineaxis. Disorders of endocrine glands. Emphasis on physiology of diabetes and stress hormones.
	<b>Unit-2</b>
<b>2a</b>	<b>Sense organs</b> - Review of structure and function. Role of skin, eye,nose and tongue in perception of stimuli.
<b>2b</b>	<b>Digestive system</b> - Review of structure and function Secretary, Digestive and absorptive function. Role of liver, pancreas and gall bladder and their dysfunction Motility and hormones of GIT. <b>Respiratory system</b> - Review of structure and function. Role of lungs in the exchange of gases, Transport of oxygen and CO, Role of haemoglobin and buffer systems Cardiorespiratory response to exercise and physiological effects of training.
<b>2c</b>	

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	<b>Unit-3</b>
<b>3a</b>	<b>The circulatory system</b> - Structure and function of heart and blood vessels Regulation of cardiac output and blood pressure, heart failure, hypertension.
<b>3b</b>	<b>Blood formation, composition, blood clotting and haemostasis:</b> Formation and function of plasma proteins, Use of blood for investigation and diagnosis of specific disorders , Anaemia.
<b>3c</b>	<b>The excretory system</b> - Structure and function of nephron. Urine formation. Role of kidney in maintaining pH of blood. - Water, electrolyte and acid base balance , diuretics.
	<b>Unit-4</b>
<b>4a</b>	<b>The Musculo-skeletal system</b> - Structure and function of bone cartilage and connective tissue. Disorders of the skeletal system. -Types of muscles- structure and function
<b>4b</b>	<b>Immune system</b> - Cell mediated and humeral immunity activation of WBC and production of antibodies. Their Role in inflammation and defence.
<b>4c</b>	<b>Reproduction</b> - Menstrual cycle, spermatogenesis, physiological changes in pregnancy.

**Course Learning Outcomes:**

Student will be able to –

1. Understand the current state of knowledge about the functional organization of the human body.
2. Develop insight of normal functioning of all the organ systems of the body and their interactions.
3. Comprehend the pathophysiology of commonly occurring diseases.
4. Correlate physiology with various disorders and their pathogenesis.




## References

- Ganong W.F.(2003)-Review of Medical Physiology.21st ed. McGraw Hill.
- Guyton A.C. and Hall J.E.(2000)Textbook of Medical Physiology.10th ed. India: Harcourt Asia..
- Tortora G.J and Grabowski S.R.(2000) Principles of Anatomy and Physiology.9th ed. John Wiley and Sons.Inc.
- West J.B.(1996): Physiological Basis of Medical Practice.12th Edition. B. I. Waverly Pvt. Ltd.
- Marieb E.N(2001) Human Anatomy and Physiology(5th ed)Pearson Education ,Inc, publishing as Benjamin Cummings.
- Jain A. K (2014) Human Physiology for BDS(5th Edition), Publisher: Avichal Publishing Company; ISBN: 9788177394337 .
- Pal G.K and Pal Pravati (2016) Comprehensive Textbook Of Medical Physiology (2Vols) Publisher: Jaypee Brothers Medical Pub (P) Ltd. ) ISBN: 5551234080758;
- Gonong, W.F. (1985) review
- Wilson, K.J.W. and Waugh, A. (1986)
- Jain, A.K. Textbook of Physiology

## Teaching Plan:

**Week 1:** Blood and Plasma Protein -Composition and Function, Blood formation and factors controlling Erythropoiesis, Pathophysiology of Anaemia and Jaundice

**Week 2:** Cardiac cycle, Cardiac output ,Heart sounds, E.C.G. & its interpretation, Heart rate & its regulation

**Week 3:** Blood pressure, Hypertension, Coronary Artery Disease, Hemorrhage, Compensatory changes after hemorrhage

**Week 4:** Transport and exchange of gases, Control of Respiration and Respiratory function test, Lung volume & Capacities and COPD

**Week 5:** Urine formation , Renal function tests, Acid Base balance, Pathophysiology of Renal Stones, Urinary Tract Infection, Glomerulonephritis

**Week 6:** Concept of Fitness, Adaptations to exercise, Energy Metabolism in Sports, Overview of Diet and Physical Performance

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**Week 7:** Functions of Stomach, Liver, Pancreas and Gall Bladder, Composition ,function and regulation of Salivary juice, Gastric juice

**Week 8:** Pancreatic juice, Bile juice Intestinal juice; GI hormones

**Week 9:** Pathophysiological overview of some common diseases in relation to Gastrointestinal Tract: Peptic ulcer/GERD, Cholelithiasis, Portal Hypertension, Fatty liver and Liver Cirrhosis

**Week 10:** Overview of organization of nervous system, Physiology of Ageing

**Week11:** Effects of Pituitary, Thyroid, Parathyroid, Adrenal and Pancreatic hormones, Pathophysiology of Diabetes Mellitus, Metabolic Syndrome, Hashimoto’s disease, Tetany and Cushing Syndrome

**Week 12:** Physiology of Menstruation and Menopause, Physiology of Pregnancy, Lactation Pathophysiology of PCOD .

**Facilitating the achievement of Course Learning Outcomes:**

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Cell structure and function Levels of cellular organization and function. Nervous System and Endocrine system.	Lectures, discussions	Assignment/ Test/ Student Presentations /Quiz ,Chart, Poster, Flash card , Models etc
2	Sense organs, Digestive system and Respiratory system.	Lectures, discussions	Assignment/ Test/ Student Presentations/ Quiz ,Chart, Poster, Flash card , Models etc
3	Structure and function of heart and blood vessels ,blood pressure, heart failure, hypertension. Anaemia ,Role of kidney in maintaining pH of blood.	Lectures, discussions ,Measurement of Pulse, BP and Oxygen Saturation	Assignment/ Test/ Student Presentations /Quiz, Chart, Poster, Flash card , Models etc
4	The Musculo-skeletal system - Structure and function of bone cartilage and connective tissue .Types of muscles- structure and function .Immune system and Menstrual cycle, spermatogenesis, physiological changes in pregnancy.	Lectures, discussions	Assignment/ Test/ Student Presentations /Quiz, Chart, Poster, Flash card , Models etc

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**Programme Name and Code-** Semester I , Paper -V

**Course Name and Code-** Practical Related to Theory Papers , HSFNP105

S.No	Topics
1	Preparation of research proposal in Home Science and its report writing.
2	Making family budget for different income groups while taking into consideration savings and taxes.
3	Important National and International food preparation using food groups.
4	Identification of foods, weights and measures.
5	Preparing market order, napking folding and table setting.
6	Developing and preparing recipes rich in – Carbohydrates, Proteins, Fat , Fibre, Calcium, Iron , Vitamin A and Vitamin C etc.
7	Preparation of 3 recipes from different Indian states.
8	Preparation of 1 low cost high nutritive value recipes.
9	Preparation and use of instructional media- Chart, Poster, Flash card , Flannel graphs, Models etc
10	Demonstration as an instructional technology- Method and Result demonstration.
11	Viva.
12	Assignments and Record Book.

  


**Programme Name and Code-** Semester II, Paper- I

**Course Name and Code-** Problems in Human Nutrition , HSFN201

**Objectives:** To familiarize the students with newer concepts in dietary management of various disorders and diseases.

1. Nutritional problems/nutrition-related diseases prevalent among the affluent and the less privileged groups, with reference to their incidence, etiology and public health significance.
2. Biochemical and clinical manifestations, preventive and therapeutic measures of the same.
3. Understand critical periods in growth and development and impact of malnutrition.

S.No	
1	<b>Unit- 1</b> <b>Historical background, prevalence, etiology, biochemical and clinical manifestations, preventive and therapeutic measures forthe following: -</b> PEM Vitamin A deficiency
2	<b>Unit- 2</b> <b>Historical background, prevalence, etiology, biochemical and clinical manifestations, preventive and therapeutic measures forthe following: -</b> Nutritional anaemia Rickets, osteomalacia and osteoporosis
3	<b>Unit- 3</b> <b>Historical background, prevalence, etiology, biochemical and clinical manifestations, preventive and therapeutic measures forthe following: -</b> Obesity and overweightDiabetes mellitus
4	<b>Unit- 4</b> <b>Historical background, prevalence, etiology, biochemical and clinical manifestations, preventive and therapeutic measures forthe following: -</b> CHD Cancer

**Course Learning Outcomes:**

Student will be able to

1. Become familiar with the concept of public health nutrition and health care of the community.
2. Understand the causes, consequences and preventive strategies for nutritional problems in the community.
3. omprehend the strategies for improving nutrition and health status of communities.

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## References

- McCollum, E.V. (1957): History of Nutrition, Houghton Mifflin Co.
- WHO (1970): Fluorides and Human Health
- Mahan, L.K. & Ecott-Stump, S. (2000): Krause's Food, Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
- World Health Organisation's Reports, Monographs and Technical Report Series.

## Journals

- World Review of Nutrition and Dietetics, Kruger
- Annual Reviews of Nutrition, Palo Alto, California, U.S.A
- Nutrition Update Series.
- The Journal of Nutrition.
- UNU Food and Nutrition Bulletin .

## Teaching Plan:

**Week 1:** Blood and Plasma Protein -Composition and Function, Blood formation and factors controlling Erythropoiesis, Pathophysiology of Anaemia and Jaundice

**Week 2:** Cardiac cycle, Cardiac output ,Heart sounds, E.C.G. & its interpretation, Heart rate & its regulation

**Week 3:** Blood pressure, Hypertension, Coronary Artery Disease, Hemorrhage, Compensatory changes after hemorrhage

**Week 4:** Transport and exchange of gases, Control of Respiration and Respiratory function test, Lung volume & Capacities and COPD

**Week 5:** Urine formation , Renal function tests, Acid Base balance, Pathophysiology of Renal Stones, Urinary Tract Infection, Glomerulonephritis

**Week 6:** Concept of Fitness, Adaptations to exercise, Energy Metabolism in Sports, Overview of Diet and Physical Performance

**Week 7:** Historical background, prevalence, etiology, biochemical and clinical manifestations, preventive and therapeutic measures for Diabetes mellitus

**Week 8:** Historical background, prevalence, etiology, biochemical and clinical manifestations, preventive and therapeutic measures for CHD

**Week 9:** Historical background, prevalence, etiology, biochemical and clinical manifestations, preventive and therapeutic measures for Cancer.



**Facilitating the achievement of Course Learning Outcomes:**

<b>Unit No.</b>	<b>Course Learning Outcomes</b>	<b>Teaching and Learning Activity</b>	<b>Assessment Tasks</b>
<b>1</b>	PEM Vitamin A deficiency	Lectures, Class discussions, Power Point presentations,	Planning and Preparation of diets/dishes and Visit to local health centre to identify clinical signs and symptoms of nutritional problems .
<b>2</b>	Nutritional anaemia Rickets, osteomalacia and osteoporosis	Lectures, Class discussions, Power Point presentations,	Planning and Preparation of diets/dishes and Visit to local health centre to identify clinical signs and symptoms of nutritional problems .
<b>3</b>	Obesity and overweight Diabetes mellitus	Lectures, Class discussions, Power Point presentations,	Planning and Preparation of diets/dishes and Visit to local health centre to identify clinical signs and symptoms of nutritional problems .
<b>4</b>	Historical background, prevalence, etiology, biochemical and clinical manifestations, preventive and therapeutic measures for the following: - CHD Cancer	Lectures, Class discussions, Power Point presentations,	Planning and Preparation of diets/dishes and Visit to local health centre to identify clinical signs and symptoms of nutritional problems .

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**Programme Name and Code-** Semester II, Paper- II

**Course Name and Code-** Clinical and Therapeutic Nutrition , HSFN202

**Objectives:** To familiarize students about estimation of RDA, deficiency of nutrients, estimation of different nutrients and metabolites in normal and diseased conditions.

1. Understand the etiology, physiological and metabolic anomalies of acute and chronic diseases and patient needs.
2. Know the effect of the various diseases on nutritional status and nutritional and dietary requirements.
3. Be able to recommend and provide appropriate nutritional care for prevention/and treatment of the various diseases.

S.No	
	<b>Unit-1</b>
<b>1a</b>	<b>Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients.</b> Identification of high risk patients. Assessment of patient needs based on interpretation of patient data-clinical, biochemical, biophysical, personal etc.
<b>1b</b>	<b>Newer trends in delivery of nutritional care and dietary counseling.</b> <b>Diet, nutrient and drug interaction.</b> Effect of drugs on ingestion, digestion, absorption and metabolism of nutrients. Effect of food, nutritional status on drug dosage and efficacy.
	<b>Unit-2</b>
<b>2a</b>	<b>Nutritional support-</b> Recent advance in techniques and feeding substrates.
<b>2b</b>	<b>Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of: -</b> <ul style="list-style-type: none"><li>•Weight imbalances</li><li>•Cardio vascular disorders</li><li>•Diabetes mellitus and other metabolic disorders</li></ul>

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<b>Unit-3</b>	
<b>3a</b>	<b>Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of: -</b> <ul style="list-style-type: none"> <li>•Cancer</li> <li>•Neurological disorders</li> <li>• Musculo-skeletal disorders</li> <li>• Immuno-deficiency disorders</li> <li>•Respiratory problems</li> </ul>
<b>3b</b>	<b>Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of: -</b> <ul style="list-style-type: none"> <li>•GI Tract Disorders</li> <li>•Liver and gall bladder, Pancreatic disorders</li> <li>• Renal disorders</li> <li>•Stress and trauma</li> </ul>
<b>Unit-4</b>	
<b>4a</b>	<b>Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of: -</b> <p>Genetic disorders Infections and AIDS</p>
<b>4b</b>	Childhood problems/disorders including inborn errors of metabolism and their nutritional management.

**Course Learning Outcomes:**

Student will be able to

- Understand the importance of nutritional assessment in the care of patients.
- Gain knowledge about causative factors and metabolic changes in various diseases/disorders and the associated principles of diet therapy.
- Learn the principles of dietary counseling.
- Comprehend the rationale of prevention of various diseases/disorders.

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## References

- Mahan, L. K. and Escott Stump. S. (2016) Krause's Food & Nutrition Therapy 14th ed. Saunders-Elsevier
- Lee RD & Neiman DC. (2009). Nutritional Assessment. 5th Edition. Brown & Benchmark.
- Gibney MJ, Elia M, Ljungqvist & Dowsett J. (2005) Clinical Nutrition. The Nutrition Society Textbook Series. Blackwell Publishing Company
- Gibson SR. (2005). Principles of Nutritional Assessment. 2nd Edition. Oxford University press
- Shils, M.E., Shike, M, Ross, A.C., Caballero B and Cousins RJ (2005) Modern Nutrition in Health and Disease. 10th ed. Lipincott, William and Wilkins.
- Williams, S.R. (2001) Basic Nutrition and Diet Therapy. 11th ed. Times Mirror Mosby College Publishing
- Fauci, S.A. et al (1998): Harrison's Principles of Internal Medicine, 14th Edition, McGraw Hill.
- World Cancer Research Fund (1997): Food, Nutrition and the Prevention of Cancer-A Global perspective, Washington E.D. WCRF

## Journals

- Nutrition Update Series
- World Review of Nutrition and Dietetics
- Journal of the American dietetic Association
- American Journal of Clinical Nutrition
- European Journal of Clinical Nutrition
- Nutrition Reviews

## Teaching Plan:

**Week 1:** Nutrition care process and Nutritional screening and assessment of nutritional status.

**Week 2:** Dietary Counselling and Effect of drugs on ingestion, digestion, absorption and metabolism of nutrients. Effect of food, nutritional status on drug dosage and efficacy.

  




**Week 3:** Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Weight imbalances ,Cardio vascular disorders .

**Week 4:** Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Diabetes mellitus and other metabolic disorders.

**Week 5:** Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Cancer ,Neurological disorders ,Musculo-skeletal disorders .

**Week 6:** Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Immuno-deficiency disorders ,Respiratory problems.

**Week 7:** Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of GI Tract Disorders ,Liver and gall bladder, Pancreatic disorders .

**Week 8 :** Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Renal disorders ,Stress and trauma.

**Week 9:** Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Renal disorders ,Stress and trauma.

**Week 10:** Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Genetic disorders ,Infections and AIDS.

**Week 11 :** Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Infections and AIDS.

**Week 12 :** Childhood problems/disorders including inborn errors of metabolism and their nutritional management.

#### Facilitating the achievement of Course Learning Outcomes:

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Nutrition care process and Nutritional screening and assessment of nutritional status, Dietary Counselling and Effect of drugs on ingestion, digestion, absorption and metabolism of	Lectures, Class discussions,	Visit to local health centre and Visit report presentations,

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	nutrients. Effect of food, nutritional status on drug dosage and efficacy.		
<b>2</b>	Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Weight imbalances ,Cardio vascular disorders ,Diabetes mellitus and other metabolic disorders	Lectures, Class discussions, Power Point presentations,	Assignment on various disorders on nutritional status, nutritional and dietary requirements.
<b>3</b>	Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Cancer ,Neurological disorders ,Musculo-skeletal disorders ,Immuno-deficiency disorders ,Respiratory problems,GI Tract Disorders ,Liver and gall bladder, Pancreatic disorders ,Renal disorders ,Stress and trauma.	Lectures, Class discussions, Power Point presentations,	Assignment on various disorders on nutritional status, nutritional and dietary requirements.
<b>4</b>	Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Genetic disorders ,Infections and AIDS. Childhood problems/disorders including inborn errors of metabolism and their nutritional management.	Lectures, Class discussions, Power Point presentations,	Assignment on various disorders on nutritional status, nutritional and dietary requirements.

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**Programme Name and Code-** Semester II, Paper- III

**Course Name and Code-** Maternal and Child Nutrition , HSFN203

**Objectives:** To enable the students to understand the role of nutrition during pregnancy, lactation and infancy.

1. Understand physiological changes in pregnancy and lactation.
2. Get acquainted with growth and developmental changes from conception till adolescence.
3. Understand the inter-relationship between nutrition and growth and development during life cycle.

S.No	
	<b>Unit- 1</b>
<b>1a</b>	Current Nutrition and Health Status of Women and Children in India.
<b>1b</b>	Changing concepts and controversies in Maternal and Child Nutrition.
	<b>Unit- 2</b>
<b>2a</b>	<b>Importance of Maternal Nutrition:</b> Importance of Nutrition during pregnancy. Pre-requisites for successful outcome. Effect of under nutrition on mother-child diad including pregnancy outcome and Maternal and Child Health-Short term and Long term. Physiology and endocrinology of pregnancy and embryonic and foetal growth and development.
<b>2b</b>	Nutritional requirements during pregnancy. Adolescent Pregnancy Pregnancy and AIDS Pregnancy and TB Intra-uterine growth retardation Complications of pregnancy and management and importance of antenatal care. Congenital malformation, foetal alcohol syndrome and gestational diabetes mellitus.

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	<b>Unit- 3</b>
<b>3a</b>	<b>Lactation Development of mammary tissue and role of hormones.</b> Physiology and endocrinology of lactation-synthesis of milk components. let down reflex, role of hormones, lactation amenorrhea, effect of breast feeding on maternal health.
<b>3b</b>	Human milk composition and factors affecting breastfeeding and fertility. Management of lactation-Prenatal breastfeeding skill education, rooming in, problems, sore nipples, engorged breast, inverted nipples etc. Exclusive breastfeeding Baby friendly hospitals initiative. Breast feeding in the age of AIDS
	<b>Unit- 4</b>
<b>4a</b>	Growth and development during infancy, childhood and adolescence. Malnutrition in mother and children: etiology and management (in brief)
<b>4b</b>	Policies and programmes for promoting maternal and child nutrition and health

### References

- UNICEF (1997). The Care initiative: Assessment, Analysis and Action to improve care for Nutrition, New York, UNICEF
- WHO (1999) Management of severe malnutrition, A manual for physicians and other senior health workers. Geneva, WHO.

### Teaching Plan:

**Week 1:** Current Nutrition and Health Status of Women and Children in India.

**Week 2:** Changing concepts and controversies in Maternal and Child Nutrition.

**Week 3:** Importance of Maternal Nutrition.

**Week 4:** Nutritional requirements during pregnancy.

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**Week 5:** Physiology and endocrinology of lactation-synthesis of milk components. let down reflex, role of hormones, lactation amenorrhea, effect of breast feeding on maternal health.

**Week 6:** Physiology and endocrinology of lactation-synthesis of milk components. let down reflex, role of hormones, lactation amenorrhea, effect of breast feeding on maternal health.

**Week 7:** Human milk composition and factors affecting breastfeeding and fertility.

**Week 8:** Management of lactation-Prenatal breastfeeding skill education, rooming in, problems, sore nipples, engorged breast, inverted nipples etc.

**Week 9:** Exclusive breastfeeding Baby friendly hospitals initiative. Breast feeding in the age of AIDS

**Week 10:** Growth and development during infancy, childhood and adolescence. Malnutrition in mother and children.

**Week 11:** Policies and programmes for promoting maternal and child nutrition and health.

**Week 12:** Policies and programmes for promoting maternal and child nutrition and health.

**Facilitating the achievement of Course Learning Outcomes:**

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Current Nutrition and Health Status of Women and Children in India. Changing concepts and controversies in Maternal and Child Nutrition.	Discussion, visits to healthcare system /ICDS Block	Report of the visits
2	Importance of Maternal Nutrition. Nutritional requirements during pregnancy.	Discussion, visits to healthcare system / ICDS Block	Report of the visits and Planning / Preparation of diets pregnancy. (Practical)
3	Physiology and endocrinology of lactation-synthesis of milk components. let down reflex, role of hormones, lactation amenorrhea, effect of breast feeding on maternal health.	Discussion, Visit to an ICDS Block	Report of the visits and Meal planning during lactation. (Practical)
4	Growth and development during infancy, childhood and adolescence. Malnutrition in mother and children. Policies and programmes for promoting maternal and child nutrition and health.	Discussion, visits to healthcare system /ICDS Block	Report of the visit and Planning and Preparation of diets for different age groups (Practical)

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**Programme Name and Code-** Semester II, Paper- IV

**Course Name and Code-** Nutrition and Health of Women , HSFN204

**Objectives :** To enable the students to understand the nutritional problems of the community and gain skills in planning, executing and evaluating nutrition projects of the community.

1. Be acquainted with the status of women in family and society.
2. Understand how various factors influence the health and nutritional status of women.
3. Plan and undertake various activities to improve the status of women.
4. Understand how health of women influences family, community and national development.

<b>S.No</b>	
	<b>UNIT-1</b>
<b>1a</b> <b>1b</b>	<b>Role of Women in National Development. Women in Family and Community</b> Demographic changes, menarche, marriage, fertility, morbidity, mortality, life expectancy, sex ratio, ageing and widowhood ,female-headed families.
	<b>UNIT-2</b>
<b>2a</b> <b>2b</b>	<b>Women and work</b> Environmental Stress, production activities, nutrition, health and gender, living conditions, occupational health, health facilities. <b>Women and Society</b> Women's role ,their resources and contribution to family and community and effect on nutritional status. Effect of urbanisation on women. Impact of economic policies, industrialization, and globalization on women.

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	<b>UNIT-3</b>
<b>3a</b>	<p><b>Women and Health</b>  Women's Nutritional Requirement and Food Need, Health facilities, Disease patterns and Reproductive health, Gender and health, Health seeking behaviour ,Women-pregnancy and lactation ,Safe Motherhood, Care of at-risk mothers, Family planning</p> <p><b>Women and ageing Special concerns in developed and developing societies:</b> Menopause, Osteoporosis, Chronic diseases, neurological problems. Women and AIDS.</p> <p><b>Women and Nutrition</b>  Situation of women in global, national and local context.</p>
<b>3b</b>	<p>Improving the nutritional and health status. Interventions throughout the life cycle.</p>
	<b>UNIT-4</b>
<b>4a</b>	<p><b>Policies and Legislations</b> - CEDAW (Convention on Elimination of all forms of Discrimination Against Women), Women's Right to Life and Health (WRLH)</p>
<b>4b</b>	<p><b>Empowerment of Women-</b> Role of Education and various national schemes.</p>

**References:**

- UNICEF (1994): The Urban Poor and Household Food Security, UNICEF.
- NGO Committee on UNICEF (1997) : Women and Children in Urban Poverty-What Way Out
- Census Reports, Government of India .
- International Nutrition Foundation -Micronutrient Initiative (1999) : Preventing Iron Deficiency in Women and Children : Technical Consensus on Key Issues.
- Gopalan, C. and Kaur, S. (Eds.) (1989): Women and Nutrition in India, Nutrition Foundation of India.

**Teaching Plan:**

**Week 1:** Role of Women in National Development.

**Week 2:**Women in Family and Community

**Week 3 to 6:**Women and work

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**Week7:** Women and Health :Women's Nutritional Requirement and Food Need, Health facilities, Disease patterns and Reproductive health, Gender and health, Health seeking behaviour ,Women-pregnancy and lactation ,Safe Motherhood, Care of at-risk mothers, Family planning .

**Week 8:**Women and Health :Menopause, Osteoporosis, Chronic diseases, neurological problems. Women and AIDS.

**Week 9:**Women and Nutrition.

**Week 10:**Women's Right to Life and Health (WRLH).

**Week11:** Empowerment of Women.

**Facilitating the achievement of Course Learning Outcomes:**

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Role of Women in National Development. Women in Family and Community	Lectures, Class discussions, Power Point presentations,	Make Scrap Book
2	Women and work- Environmental Stress, production activities, nutrition, health and gender, living conditions, occupational health, health facilities. Women and Society.	Lectures, Class discussions	Make Scrap Book
3	Women and Health :Women's Nutritional Requirement and Food Need, Health facilities, Disease patterns and Reproductive health, Gender and health, Health seeking behaviour ,Women-pregnancy and lactation ,Safe Motherhood, Care of at-risk mothers, Family planning . Women and Health :Menopause, Osteoporosis, Chronic diseases, neurological problems. Women and AIDS.	Lectures, Class discussions, Power Point presentations,	Make Scrap Book and Market survey of commercial nutritional supplements and nutritional support substrates.
4	Women's Right to Life and Health (WRLH).	Lectures, Class discussions.	Make Scrap Book

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**Programme Name and Code-** Semester II, PAPER-V

**Course Name and Code-** Practical Related to Theory Papers , HSFNP205

S.No	Topics
1	<b>Planning and Preparation of diets/dishes for individuals suffering from:</b> PEM, Nutritional Anaemia ,Obesity and Overweight, Diabetes mellitus and other metabolic disorders, Cardio vascular disorders, Underweight, Peptic ulcer , Jaundice , Diarrhoea , Constipation and Diet in surgery.
2	Visit to local health centre to identify clinical signs and symptoms of nutritional problems .
3	Visit to an ICDS Block and report writing.
4	<b>Assessment of nutritional status-</b> 24 hour dietary recall, Anthropometry,Clinical assessment.
5	<b>Planning and Preparation of diets for different age groups</b> – Infancy, Preschool age , School age , Adolescent ,Adult and Old age.
6	Planning and Preparation of diets for Pregnant and Lactating women.
7	<b>Planning and Preparation of diets for special occasions</b> – Birthdays, Festivals and Packed Lunches.
8	Market survey of commercial nutritional supplements and nutritional support substrates.
9	<b>Make Scrap Book related to any field-</b> Health of women, Women and society, Women and work ,Role of women in National Development.
10	Viva.
11	Assignment and Record Book.

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**Programme Name and Code-** Semester III , Paper- I

**Course Name and Code-** Public Nutrition , HSFN301

**Objective :**

- Develop a holistic knowledge base and understanding of the nature of important nutrition problems and their prevention and control for the disadvantaged and upper socio-economic strata in society.
- Understand the causes/determinants and consequences of nutrition problems in society
- Be familiar with various approaches to nutrition and health interventions, programmes and policies.

S.No	
	<b>UNIT-1</b>
<b>1a</b>	<b>Concept of public nutrition-</b> relationship between health and nutrition, role of public nutritionists in the health care delivery.
<b>1b</b>	<b>Sectors and Public Policies relevant to Nutrition.</b> <b>Primary Health Care of the Community</b> -National Health Care Delivery System, Determinants of Health Status ,Indicators of Health
	<b>UNIT-2</b>
<b>2a</b>	<b>Population Dynamics</b> Demographic transition, population structure, fertility behaviour, population policy. fertility, nutrition and quality of life inter-relationship.
<b>2b</b>	<b>Food and Nutrition Security</b> Food production, Assess, Distribution Availability, Losses, Consumption, Food Security. Socio-cultural aspects and Dietary Patterns : Their implications for Nutrition and Health.
	<b>UNIT-3</b>
<b>3a</b>	<b>Nutritional Status</b> Determinants of nutritional status of individual and populations : Nutrition and Nonnutritional indicators : Socio-cultural, biologic, environmental and economic <b>Major Nutritional Problems</b> : etiology, prevalence, clinical manifestations, preventive and therapeutic measures of : Macro and micro nutrient deficiencies. Other nutritional problems like lathyrism, dropsy, aflatoxicosis, alcoholism, fluorosis. Overweight, obesity and chronic degenerative diseases.
<b>3b</b>	<b>National Food and Nutrition Policy, Plan of Action and Programmes.</b>

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<b>UNIT-4</b>	
<b>4a</b>	<p><b>Approaches and Strategies for improving nutritional status and health:</b> Programmatic options-their advantages and demerits. Feasibility, Political support, available resourced (human, financial, infrastructural)</p> <p><b>Case studies of selected strategies and programmes:</b> their rationale and context, how to select interventions from a range of possible options: Health-based interventions, Food-based interventions including fortification and genetic improvement of foods, supplementary feeding, and Nutrition education for behaviour change.</p>
<b>4b</b>	<p><b>Policy Analysis and Operational Research.</b></p> <p><b>Programme Design Planning, Implementation, Operations Monitoring, Surveillance and Evaluation.</b></p> <p><b>Health Economics and Economics of Malnutrition</b> - Its impact on productivity and national development. Cost- Benefit, Cost effectiveness and Cost efficiency.</p>

**Course Learning Outcomes:**

The students will:

1. Become familiar with the prevalence and determinants of nutritional/ health problems in the population.
2. Acquire knowledge about the public health implications of various nutritional problems and the strategies to overcome the same.
3. Get acquainted with national/ public sector policies and programmes for promotion of health and nutritional status in India.

  


## References

- Ramakrishnan U. (eds.) (2001), Nutritional Anemias: CRC Press in Modern Nutrition, CRC Press, Boca Raton FL.
- Park K. (2000): Park's Textbook of Preventive and Social Medicine, 18th Edition, M/s. Banarasidas Bhanot, Jabalpur.
- National Family Health Survey I & II (1993, 2000): International Institute for population Studies, Mumbai.
- Gopalan C. and Kaur S. (Eds.) (1989) : Women and Nutrition in India, Nutrition Foundation of India.
- Nutrition Education for the Public (1997): FAO Food and Nutrition Paper, 62, FAO.
- World Health Organization (1998) World Health Report: Life in the 21st Century Report of the Director General, WHO, Geneva, Switzerland.
- National Nutrition Policy (1993): Dept. of WCD, Govt. of India

## Teaching Plan:

**Week 1:** Concept of public nutrition and Primary Health Care of the Community.

**Week 2:** Concept of public nutrition and Primary Health Care of the Community.

**Week 3:** Population Dynamics ,Food and Nutrition Security.

**Week 4:** Population Dynamics ,Food and Nutrition Security.

**Week 5:** Nutritional Status, Major Nutritional Problems, National Food and Nutrition Policy, Plan of Action and Programmes.

**Week 6:** Nutritional Status, Major Nutritional Problems, National Food and Nutrition Policy, Plan of Action and Programmes.

**Week 7:** Approaches and Strategies for improving nutritional status and health

**Week 8:** Case studies of selected strategies and programmes

**Week 9:** Policy Analysis and Operational Research.

**Week 10:** Programme Design Planning, Implementation, Operations Monitoring, Surveillance and Evaluation.

**Week 11:** Health Economics and Economics of Malnutrition.

  


**Facilitating the achievement of Course Learning Outcomes:**

<b>Unit No.</b>	<b>Course Learning Outcomes</b>	<b>Teaching and Learning Activity</b>	<b>Assessment Tasks</b>
<b>1</b>	Concept of public nutrition and Primary Health Care of the Community.	Lectures, Class discussions, Power Point presentations.	Visit to Primary Health Care and report writing.
<b>2</b>	Population Dynamics ,Food and Nutrition Security.	Lectures, Class discussions, Power Point presentations.	Visit to an ongoing NHC program in ICDS- one rural ,one urban(eg.mahila mandal meeting or nutrition week celebration .) and report writing.
<b>3</b>	Nutritional Status, Major Nutritional Problems, National Food and Nutrition Policy, Plan of Action and Programmes.	Lectures, Class discussions, Power Point presentations.	Visit to an ongoing NHC program in ICDS- one rural ,one urban(eg.mahila mandal meeting or nutrition week celebration .) and report writing.
<b>4</b>	Approaches and Strategies for improving nutritional status and health Case studies of selected strategies and programmes Policy Analysis and Operational Research.Programme Design Planning, Implementation, Operations Monitoring, Surveillance and Evaluation. Health Economics and Economics of Malnutrition.	Lectures, Class discussions, Power Point presentations.	Visit to an ongoing NHC program in ICDS- one rural ,one urban(eg.mahila mandal meeting or nutrition week celebration .) and report writing.

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**Programme Name and Code-** Semester III , Paper- II

**Course Name and Code-** Nutrition for Health and Fitness , HSFN302

**Objectives :**

1. To learn the concepts of fitness, methods of assessing fitness, exercises for physical fitness and bioenergetics of exercise and role of macro- and micro-nutrients in sports performance and to gain knowledge & application skills with respect to nutrition for high performance sports, through the life-cycle and diet & nutritional care of special groups of athletes.

2. To enable the students to know the recent techniques of body composition and energy metabolism for the assessment of nutritional status.

S.No		Credit	Hours
	<b>UNIT-1</b>		
<b>1a</b>	<b>Definition, components and assessment criteria of age:</b> Specific fitness and health status. <b>Holistic approach to the management of fitness and health:</b> Energy input and output. Diet and Exercise. Effect of specific nutrients on work performance and physical fitness. Nutrition, exercise, physical fitness and health and their inter-relationships.		
<b>1b</b>	<b>Review of different energy systems for endurance and power activity:</b> Fuels and nutrients to support physical activity. Shift in carbohydrate and fat metabolism. Mobilization of stores during exercise.		
	<b>UNIT-2</b>		
<b>2a</b>	<b>Nutrition in Sports:</b> Sports specific requirement. Diet manipulation. Pre-game and post game meals. Assessment of different nutrigenic aids and commercial supplements. Diets for persons with high energy requirements, stress, fracture and injury.		

  


2b	<b>Water and electrolyte balance:</b> Losses and their replenishment during exercise and sports events, effect of dehydration, sports drinks.		
<b>UNIT-3</b>			
3a	Significance of physical fitness and nutrition in the prevention and management of weight control, obesity, diabetes mellitus, CV disorders, bone health and cancer.		
3b	<b>Nutritional and exercise regimes for management of obesity:</b> Critical review of various dietary regimes for weight and fat reduction. Prevention of weight cycling .		
<b>UNIT-4</b>			
4a	Defining nutritional goals/guidelines appropriate to health, fitness and prevention and management of the above chronic degenerative disorders. <b>Nutrition and exercise regimes for pre and post-natal fitness.</b>		
4b	<b>Alternative systems for health and fitness like</b> Ayurveda, yoga, meditation, vegetarianism and traditional diets.		

**Course Learning Outcomes:**

After this course the student should be able to:

1. Understand the components of health and fitness and the role of nutrition in these.
2. Make nutritional, dietary and physical activity recommendations to achieve fitness and well-being.
3. Develop ability to evaluate fitness and well-being.
4. Provide diet and nutritional care in terms of nutrition education, diet plans and counselling to special groups of athletes.

**References**

- Mahan L.K. & Ecott-Stump S. (2000): Krause's Food, nutrition and Diet Therapy, 10th Edition, W.B Saunders Ltd.
- Sizer F. & Whitney, E. (2000): Nutrition - Concepts & Controversies, 8th Edition, Wadsworth Thomson Learning.

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•Whitney E.N. & Rolfes S.R. (1999): Understanding Nutrition, 8th Edition, West/Wadsworth, An international Thomson Publishing Co.

•Ira Wolinsky (Ed) (1998): Nutrition in Exercise and Sports, 3rd Edition, CRC Press.

### **Journals**

•Medicine and Science in Sport and Exercise.

• International Journal of Sports Nutrition

### **Teaching Plan:**

**Week 1:** Definition of physical fitness, Components of physical fitness, Methods of assessing physical fitness

**Week 2:** Approaches to achieving physical fitness through the life cycle, Assessment of Sports performance

**Week 3:** Bioenergetics and body metabolism of physical activity and sports .

**Week 4:** Macro- and micro nutrients for sport performance

**Week 5:** Temperature regulation, fluid balance, fluid requirements of athletes and rehydration strategies for sports

**Week 6:** Recommended allowances and nutritional guidelines for different categories of high performance sports

**Week 7:** Nutritional care during Training, and day-today recovery

**Week 8:** Nutrition for the Pre-competition, Competition and post competition recovery phase

**Week 9:** Weight management in athletes

**Week 10:** Supplements in Sport :performance enhancing substances ,drugs, ergogenic aids and herbs in sports performance

**Week 11:** Nutritional care for children and adolescent athletes, Athletes with special needsParalympics & special Olympics, vegetarian athletes.

 



**Facilitating the achievement of Course Learning Outcomes:**

<b>Unit No.</b>	<b>Course Learning Outcomes</b>	<b>Teaching and Learning Activity</b>	<b>Assessment Tasks</b>
<b>1</b>	Definition of physical fitness, Components of physical fitness, Methods of assessing physical fitness . Holistic approach to the management of fitness and health. Bioenergetics and body metabolism of physical activity and sports.	Lectures, Class discussions, Power Point presentations.	Quiz ,Assignment
<b>2</b>	Nutrition in Sports, Water and electrolyte balance.	Lectures, Class discussions, Power Point presentations.	Food for sports person in intensive activites and endurance activities. (Practical)
<b>3</b>	Significance of physical fitness and nutrition in the prevention and management of weight control, obesity, diabetes mellitus, CV disorders, bone health and cancer.	Lectures, Class discussions, Power Point presentations.	Food for sports person in intensive activites and endurance activities. (Practical)
<b>4</b>	Nutrition and exercise regimes for pre and post-natal fitness. Alternative systems for health and fitness like Ayurveda, yoga, meditation, vegetarianism and traditional diets.	Lectures, Class discussions, Power Point presentations.	Food for sports person in intensive activites and endurance activities. (Practical)

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**Programme Name and Code-** Semester III , Paper- III

**Course Name and Code-** Assessment of Nutrition Status , HSFN303

**Objectives:** To enable the students to know the recent techniques of body composition and energy metabolism for the assessment of nutritional status.

1. Orient the students with all the important state-of-the-art methodologies applied in nutritional assessment and surveillance of human groups.
2. Develop Specific skills to apply the most widely used methods.

S.No	
1	<b>UNIT-1</b> Nutritional assessment as a tool for improving the quality of life of various segments of the population including hospitalized patients.
2	<b>UNIT-2</b> Current methodologies of assessment of nutritional status, their interpretation and comparative applications of the following: - Food consumption - Anthropometry - Clinical and Laboratory - Rapid Assessment & PRA - Functional indicators such as grip strength, respiratory fitness, Harvard Step test, Squatting test.
3	<b>UNIT-3</b> Nutritional Surveillance - Basic concepts, uses and setting up of surveillance systems.
4	<b>UNIT-4</b> Monitoring and Evaluation.

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**Course Learning Outcomes:**

On completion of the course, students are expected to be able to –

1. Understand the concept and purpose of nutritional status assessment in community setting.
2. Develop an understanding of the concept of nutrition monitoring and nutrition surveillance.
3. Gain knowledge with regard to standard methods and techniques for assessing nutritional status.

## References

- Jelliffe D.B. and Jelliffe E.F.P. (1989): Community Nutritional Assessment, Oxford University Press.
- Sauberlich, H.E. (Ed) (1999): Laboratory Tests for the Assessment of Nutrition Status, CRC Press.
- Bingham, S.A. (1987): The Dietary Assessment of Individuals, Methods, Accuracy, New Techniques and Recommendations. Nutrition Abstracts and Reviews, 57:705- 743.
- Collins, K.J. (Ed)(1990) Handbook of Methods for the measurement of Work Performance, Physical Fitness and Energy Expenditure in Tropical Populations, International Union of Biological Sciences.
- Himes, J.H. (1991): Anthropometric Assessment of Nutritional Status. Wiley-Liss, New York.
- Lehman T.G.; Roche, A.F.; and Martorell R. (Ed) Anthropometric Standardization Reference Manual. Human Kinetics Books, Illinois.

## Teaching Plan:

**Week 1-3** : Introduction to Nutritional status assessment.

**Week 4-10**: Methods of community nutritional assessment .

**Week 11**: Nutritional Surveillance - Basic concepts, uses and setting up of surveillance systems.

**Week 12**: Monitoring and Evaluation.

## Facilitating the achievement of Course Learning Outcomes:

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Introduction to Nutritional status assessment.	Lectures, Class discussions, Power Point presentations.	Quiz ,Assignment, Make Scrap Book
2	Methods of community nutritional assessment .	Lectures, Class discussions, Power Point presentations.	Quiz ,Assignment ,Make Scrap Book
3	Nutritional Surveillance - Basic concepts, uses and setting up of surveillance systems.	Lectures, Class discussions.	Quiz ,Assignment ,Make Scrap Book
4	Monitoring and Evaluation.	Lectures, Class discussions	Quiz ,Assignment ,Make Scrap Book

**Programme Name and Code-** Semester III , Paper- IV

**Course Name and Code-** Improving Health and Nutrition , HSFN304

**Objectives :**

1. Develop understanding regarding the vital aspects of communication and various Audio and Visual Media/Mass Media and their use in Nutrition and Health Education.
2. Be familiar with important IEC programmes.
3. Develop skills to plan and use IEC.

S.No	
	<b>UNIT-1</b>
<b>1a</b>	<b>Concept of Communication</b> <ul style="list-style-type: none"><li>- Concept of Communication and Mass Communication</li><li>- Scope of Communication</li><li>- Elements of Communication</li><li>- Models of Communication</li><li>- Communication Process</li><li>- Approaches to Communication</li><li>- Barriers to Communication</li><li>- Communication for Extension Education and Development</li></ul>
<b>1b</b>	<b>Introduction to IEC (Information, Education and Communication).</b> <b>Aims and Objectives: Importance of IEC, relevance to programmes.</b> <b>IEC for Behavioural Changes: Behaviour and determinants of behaviour need for IEC.</b>

 

	<b>UNIT-2</b>
<b>2a</b>	Deferent Media, their characteristics and use a. Audio visual aids (Graphics aids, puppets and other three dimensional aids, display boards and projected and non-projected aids). b. Mass Media: Print, Radio/Recordings, Films, Television/video, Advertising, Journalism
<b>2b</b>	Methods, Techniques and Tools.
	<b>UNIT-3</b>
<b>3a</b>	<b>Planning effective IEC Programmes-</b> Broad-based strategy and for specific objectives. Identification of key messages for re-enforcement, preparation of IEC material. Refining of IEC messages. Social mobilisation, social marketing and role of community. Training to use IEC.
<b>3b</b>	<b>Implementation - Use of IEC, training supportive supervision and monitoring.</b> <b>IEC for different target groups:</b> Policy makers, Managerial level and middle level officials from Government donor agencies and NGOs, Grassroots functionaries, Community.
	<b>UNIT-4</b>
<b>4a</b>	<b>Impact Assessment</b> <b>Case studies of various IEC programmes</b>
<b>4b</b>	<b>Specific National Programmes and IEC - Influence at mass level</b>

### Course Learning Outcomes:

The students will be able to:

1. Gain knowledge on the basics of communication strategies and best suited methods of communicating with individuals to select appropriate strategies presented with dietary problems .
2. Understand the importance of IEC in managing nutrition related problems .
3. Gain knowledge on traditional and alternate methods to manage disorders.

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## References

- Matarazzo J.D.; Weiss S.M.; Herd J.A.; Muller N.E.; Weiss S. (Eds) (1984): Behavioural Health: A handbook of health enhancement and disease prevention, John Wiley, New York.
- Wallach L.; Dorfman L., Jemigan D., Themba M. (1993): Media Advocacy and Public Health: Power for Prevention, Newbury Park, CA: Sage.

## Teaching Plan:

**Week 1:** Meaning of Communication, Forms of communication: Verbal and Non-verbal Communication, Communication methods: Intrapersonal, Interpersonal and Mass communication.

**Week 2:** Introduction to IEC (Information, Education and Communication).

**Week 3-7:** Deferent Media, their characteristics and use a. Audio visual aids (Graphics aids, puppets and other three dimensional aids, display boards and projected and non-projected aids).b. Mass Media: Print, Radio/Recordings, Films, Television/video, Advertising, Journalism .

**Week 8:** Planning effective IEC Programmes.

**Week 9:** Implementation - Use of IEC, training supportive supervision and monitoring.

**Week 10:** IEC for different target groups: Policy makers, Managerial level and middle level officials from Government donor agencies and NGOs, Grassroots functionaries, Community.

**Week 11:** Impact Assessment, Case studies of various IEC programmes .

**Week 12:** Specific National Programmes and IEC - Influence at mass level.

## Facilitating the achievement of Course Learning Outcomes:

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Meaning of Communication, Forms of communication: Verbal and Non-verbal Communication, Communication methods: Intrapersonal, Interpersonal and Mass communication. Introduction to IEC (Information, Education and Communication).	Lectures, Class discussions, Power Point presentations.	Development of audio,visual aids-radio script, popular article , chart/posters, Graphics aids, puppets,projected and non-projected aids. (Practical)
2	Deferent Media, their characteristics and use a. Audio visual aids (Graphics aids, puppets and other three	Lectures, Class discussions, Power Point presentations.	Development of audio,visual aids-radio script, popular article ,

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	dimensional aids, display boards and projected and non-projected aids).b. Mass Media: Print, Radio/Recordings, Films, Television/video, Advertising, Journalism .		chart/posters, Graphics aids, puppets,projected and non-projected aids. (Practical)
<b>3</b>	Planning effective IEC Programmes. Implementation - Use of IEC, training supportive supervision and monitoring. IEC for different target groups: Policy makers, Managerial level and middle level officials from Government donor agencies and NGOs, Grassroots functionaries, Community.	Lectures, Class discussions, Power Point presentations.	Development of audio,visual aids-radio script, popular article , chart/posters, Graphics aids, puppets,projected and non-projected aids. (Practical)
<b>4</b>	Impact Assessment, Case studies of various IEC programmes . Specific National Programmes and IEC - Influence at mass level.	Lectures, Class discussions, Power Point presentations.	Development of audio,visual aids-radio script, popular article , chart/posters, Graphics aids, puppets,projected and non-projected aids. (Practical)

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**Programme Name and Code-** Semester III , Paper- V

**Course Name and Code-** Practical Related to Theory Papers , HSFNP305

S.No	Topics
1	Visit to Primary Health Care and report writing.
2	Comparison of rural ,urban and tribal communities for – (a)Determinants of malnutrition,(b) Social-Economic groups,(c) The types of nutritional problems in different segments and age groups through analysis of secondary data.
3	Visit to an ongoing NHC program in ICDS- one rural ,one urban(eg.mahila mandal meeting or nutrition week celebration .) and report writing.
4	Development of Low cost nutritional recipes suitable for various vulnerable groups at micro,meso and macro levels.
5	Preparation of High/Low energy, High/low protein, High/Low fiber, Low sodium, Low cholesterol, Low glycemic index, Low Fluid , High and Low fat foods.
6	Food for sports person in intensive activities and endurance activities.
7	Assessment of nutritional status –Methods and Application.
8	Make Scrap Book Related to any field- Health and Nutrition, National Food and Nutrition Policy, Health and Fitness.
9	Development of audio,visual aids-radio script, popular article , chart/posters, Graphics aids, puppets,projected and non-projected aids.
10	Viva
11	Assignment and Record Book.

  




**Programme Name and Code-** Semester IV , Paper- I

**Course Name and Code-** Management of Nutrition Programmes , HSFN401

### Objectives

1. Be familiar with various programmes which can be undertaken to prevent and control nutritional problems at regional and national level.
2. Be able to plan, implement, monitor and evaluate programmes.

S.No	
	<b>UNIT-1</b>
1a	<b>Global, National and Regional Concerns</b> - Situation of vulnerable groups vis-a-vis food, nutrition and health security.
1b	<b>Programme Development</b> - Overview of programme development models. Formative evaluation approach. Precede- proceed planning mode. Sussmean's fourstep model of empirical curriculum development, chain model.
	<b>UNIT-2</b>
2a	<b>Programme Planning</b> - Pre-requisites for planning vis-a-vis short term and long term objectives. Planning at various levels
2b	- Government local health department, state, voluntary sector and community-based. Approaches used in planning - Top-down approach, need-based approach. Community participation and partnership, rightsbased approach. <b>Appraisal of existing programmes and interventions-</b> Merits, demerits. Lacunae ,gaps vis-a-vis objectives and goals.
	<b>UNIT-3</b>
3a	<b>Implementation of Programmes-</b> Developing prototypes, training and HRD aspects of the programmes. Pilot and prototype studies, innovations.
3b	<b>Scaling - up of programme-</b> Centralisation and decentralisation, vertical and horizontal linkages, intersectoral linkages, involvement of corporate sectors. Legal issues. Financial Management, Cost benefits, Cost effectiveness and Cost efficiency.
	<b>UNIT-4</b>
4	<b>Management Information Systems (MIS)-</b> Study of development of suitable Information Systems for Nutrition Programmes.

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## **Course Learning Outcomes:**

The students will:

1. Become familiar with the process of planning and management of nutrition programmes.
2. Develop an understanding of the concept of nutrition monitoring and nutrition surveillance.

## **References**

- Sethi Mohini (2005) Institution Food Management. New Age International Publishers
- Dessler Gary ( 2007) Human Resource Management 11th edition Prentice Hall New Jersey
- Taneja S and Gupta SL ( 2001) Entrepreneurship development, Galgotia Publishing
- Luthans Fred (2004) Organisational Behaviour 10th Edition Mc Graw Hill International

## **Teaching Plan:**

**Week 1:** Global, National and Regional Concerns

**Week 2:** Programme Development - Overview of programme development models. Formative evaluation approach. Precede- proceed planning mode. Sussmean's fourstep model of empirical curriculum development, chain model

**Week 3-4:** Programme Planning.

**Week 5-6:** Appraisal of existing programmes and interventions.

**Week 7:** Implementation of Programmes.

**Week 8:** Scaling - up of programme.

**Week 9-11:** Management Information Systems (MIS)- Study of development of suitable Information Systems for Nutrition Programmes.



**Facilitating the achievement of Course Learning Outcomes:**

<b>Unit No.</b>	<b>Course Learning Outcomes</b>	<b>Teaching and Learning Activity</b>	<b>Assessment Tasks</b>
<b>1</b>	Global, National and Regional Concerns, Programme Development - Overview of programme development models. Formative evaluation approach. Precede-proceed planning mode. Sussmean's fourstep model of empirical curriculum development, chain model	Lectures, Class discussions,	Assignment
<b>2</b>	Programme Planning. Appraisal of existing programmes and interventions.	Lectures, Class discussions,	Assignment
<b>3</b>	Implementation of Programmes. Scaling - up of programme.	Lectures, Class discussions,	Visit to food industries, Market survey and analysis of processed and finished products.
<b>4</b>	Management Information Systems (MIS)- Study of development of suitable Information Systems for Nutrition Programmes.	Lectures, Class discussions,	Management of cafeteria- Preparation, costing and fixing of price for meal items.

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**Programme Name and Code-** Semester IV , Paper- II

**Course Name and Code-** Institutional Food Administration , HSFN402

**Objectives:** To enable the students to understand the process of planning, organizing and controlling the management of food and other resources in institutions.

- 1.To develop a knowledge base about the facilities required for different types of food service units and to equip individuals in understanding and managing resources in a food service institution.
- 2.To provide practical field level experience in Institutional Food administration.
- 3.To impart necessary expertise to function as a food service manager.
- 4.To develop critical abilities and provide basic grounding in research techniques.

S.No		Credit	Hours
	<b>UNIT-1</b>		
<b>1a</b>	<b>Introduction to Food Service Systems</b> Evolution of the food service industry, Characteristics of the various types of food service units		
<b>1b</b>	<b>Approaches to Management</b> Theories of management, Aspects of management, Styles of management, Management tools		
	<b>UNIT-2</b>		
<b>2a</b>	<b>Strategies in Planning</b> Conceptual strategy, Marketing strategy, Financial Strategy, Types of plans		
<b>2b</b>	<b>Management of Resources</b> <ul style="list-style-type: none"><li>• Finance Determining the finance needed to establish or run an unit, Budgets, Sources of finance, Planning adequate cash flow</li><li>• Space &amp; Equipment Steps in planning layouts, Determining equipment, Selection and placement, Maintenance of equipment, Layout analysis</li></ul>		

  


<p><b>3a</b></p>	<p style="text-align: center;"><b>UNIT-3</b></p> <p><b>Management of Resources</b></p> <ul style="list-style-type: none"> <li>• Material Menu planning, Planning the material needed, Methods of selection, Storage, Quantity food production, Service and modes of delivery</li> <li>• Staff Manpower planning, Manpower placement, Recruitment, induction, training. Motivation and performance appraisal • Time and Energy - Measures for utilisation and conservation</li> </ul>		
<p><b>3b</b></p>	<p><b>Techno-economic feasibility of food production/service enterprise</b></p>		
	<p style="text-align: center;"><b>UNIT-4</b></p>		
<p><b>4a</b></p>	<p><b>Cost accounting/analysis</b></p> <ul style="list-style-type: none"> <li>• Food cost analysis</li> <li>• Records to be maintained</li> <li>• Reports and trend analysis</li> </ul> <p><b>Marketing and sales management</b></p> <ul style="list-style-type: none"> <li>• Marketing strategies</li> <li>• Sales analysis</li> <li>• Market promotion</li> </ul>		
<p><b>4b</b></p>	<p><b>Quality assurance</b></p> <ul style="list-style-type: none"> <li>• Food quality</li> <li>• Total quality management</li> </ul> <p><b>Computer aided record maintenance and management.</b></p>		




## **Course Learning Outcomes:**

Student will be able to:

1. Gain expertise to function as a food service manager.
2. Develop knowledge in managing various food service systems.
3. Understand and manage resources in a food service institution.
4. Provide practical experience in managing food material for food service management.

## **References**

### **Management:**

- West, B Bessie & Wood, Level (1988) Food Service in Institution 6th Edition. Revised by Harger FV. Shuggart SG & Palgne-Palacio: Macmillian Publication Company, New York.
- Kotas Richard & Jayawardardene C (1994): Profitable Food and Beverage Management, Hodder & Stoughton Publication.
- Green E.F., Drake G.G. Sweeny J.F. (1978) :Profitable Food and Beverage Management: Planning, Operations :Hayden Book Company, New Jersey.
- Knootz, HG, O Donnel C (1968) Principles of Management McGraw Hill Book Company.

### **Personnel Management**

- Desseler, Garry (1987) Personnel Management Modern Concepts and Techniques, Prentice Hall New Jersey
- Kumar, H.L. (1986) Personnel Management in Hotel and Catering Industries, Metropolitan Book Company N. Delhi.

### **Cost Control**

- Keiser, J & Kaillo, E. (1974): Controlling and Analysis of Cost in Food Service Operations Wiley and Sons N. York.
- Khari, W.L. (I) (1977): Introduction To Modern Food and beverage Service. (1979) Advanced Modern Food and Beverage service: Prentice Hall series
- Levison (1976): Food and Beverage Operation Cost Control & System Management: Prentice Hall Series.

 

**Teaching Plan:****Week 1:** Introduction to Food Service Systems.**Week 2:** Approaches to Management .**Week 3:** Strategies in Planning:Conceptual strategy, Marketing strategy, Financial Strategy, Types of plans.**Week 4-7:** Management of Resources.**Week 8:** Techno-economic feasibility of food production/service enterprise.**Week 9:** Cost accounting/analysis .**Week 10:** Marketing and sales management.**Week 11:** Quality assurance.**Week 12:** Computer aided record maintenance and management.**Facilitating the achievement of Course Learning Outcomes:**

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Introduction to Food Service Systems. Approaches to Management .	Lectures, Class discussions	Layout analysis of kitchens.
2	Strategies in Planning:Conceptual strategy, Marketing strategy, Financial Strategy, Types of plans.	Lectures, Class discussions	Market survey of Food service equipment.
3	Management of Resources. Techno-economic feasibility of food production/service enterprise.	Lectures, Class discussions	Visit to canteen attached to hospital and dietary department cafeteria, 3star hotel/restaurant , 5 star hotel/restaurant ,industrial canteen. And Menu planning for industrial canteen,hospital canteen,cafeteria,snack bar,residential hostel.
4	Cost accounting/analysis . Marketing and sales management. Quality assurance.	Lectures, Class discussions	Visit to food industries,Market survey and analysis of processed and finished products.

**Programme Name and Code-** Semester IV , Paper- III

**Course Name and Code-** Food Safety and Quality Control , HSFN403

**Objectives:** To acquaint the students with principles, techniques and application of different methods of analysis for various nutrients and enable the students to understand the concept of product development, their sensory evaluation and quality control.

1. Know the importance of quality assurance in food industry.
2. Know the various tests and standards for quality assessment and food safety.
3. Know the various tests used to detect food adulterants.
4. Be familiar with the fundamentals that should be considered for a successful quality control programme.

S.No		Credit	Hours
	<b>UNIT-1</b>		
<b>1a</b>	<b>Importance of food standards:</b> Quality control and assurance, food safety assurance.		
<b>1b</b>	<b>Quality assurance programme:</b> Quality plan, documentation of records, product standards Product and purchase specifications, process control and HACCP, hygiene and housekeeping, corrective action, quality and programme and total quality process.		
	<b>UNIT-2</b>		
<b>2a</b>	<b>Quality Costs:</b> Measurement and Analysis.		
<b>2b</b>	<b>Product Evaluation:</b> Sampling for product evaluation; Sample preparation		
	<b>UNIT-3</b>		
<b>3a</b>	<b>Tests for specific raw food ingredients:</b> Proximate Principles; Nutrient Analysis.		
<b>3b</b>	<b>Hazards to Food Products:</b> Micro-biological, environmental, natural, toxicants, pesticide residues and food additives.		

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<b>UNIT-4</b>			
<b>4a</b>	<b>Food Adulteration:</b> Common Adulterants; Methods and Tests for detecting Adulterants.		
<b>4b</b>	<b>Food standards, laws and regulations to ensure safety of food:</b> Prevention of Food Adulteration Act, 1954; Essential Commodities Act, 1955; Fruit Product Order, 1946; Directorate of Grading, Marketing and Inspection of Agricultural Products; Bureau of Indian Standards, 1952; Standards Weights & Measures Act 1976.		

**Course Learning Outcomes:**

Student will be able to –

1. Understand the nature of microorganisms involved in food spoilage, food infections and intoxications.
2. Comprehend principles of various preservation and control techniques.
3. Understand microbial safety in various foods operations.

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## References

- Food and Agriculture Organization (1980) Manual of Food Quality Control, Additive Contaminants Techniques. Rome.
- Gould, W.A. and Gould, R.W. (1988): Total Quality Assurance for the Food Industries, CTI Publications Inc Baltimore.
- Pomeranz, Y. and Meloan, C.E. (1996): Food Analysis: Theory and Practice, CBS Publishers and Distributor, New Delhi.
- Askar, A. and Treptow, H. (1993): Quality Assurance in Tropical Fruit Processing, Springer - Veriag, Berlin.
- World Health Organisation (1998): Guidelines for Drinking Water Quality, 2th edition, Vols. 1,2, and 3, Geneva.
- Bureau of Indian Standards: Specifications and Standard Methods.

## Teaching Plan:

**Week 1:** Importance of food standards: Quality control and assurance, food safety assurance.

**Week 2-3:** Quality assurance programme

**Week 3-4:** Quality Costs: Measurement and Analysis.

**Week 5-6** Product Evaluation: Sampling for product evaluation; Sample preparation.

**Week 7:** Tests for specific raw food ingredient.

**Week 8:** Hazards to Food Products.

**Week 9:** Food Adulteration: Common Adulterants; Methods and Tests for detecting Adulterants.

**Week 10-12:** Food standards, laws and regulations to ensure safety of food

  


**Facilitating the achievement of Course Learning Outcomes:**

<b>Unit No.</b>	<b>Course Learning Outcomes</b>	<b>Teaching and Learning Activity</b>	<b>Assessment Tasks</b>
<b>1</b>	Importance of food standards: Quality control and assurance, food safety assurance. Quality assurance programme	Lectures, Class discussions, Power Point presentations.	Assignment ,Visit to food industries,Market survey and analysis of processed and finished products. (Practical)
<b>2</b>	Quality Costs: Measurement and Analysis. Product Evaluation: Sampling for product evaluation; Sample preparation.	Lectures, Class discussions, Power Point presentations.	Visit to food industries,Market survey and analysis of processed and finished products (Practical)
<b>3</b>	Tests for specific raw food ingredient. Hazards to Food Products.	Lectures, Class discussions, Power Point presentations.	Preparation and Preservation any one given recipe- Jam,Jelly ,Pickles,Ketch-up,Chutneys,Avala Morava,Avala supari,Lime and orange squashes etc. (Practical)
<b>4</b>	Food Adulteration: Common Adulterants; Methods and Tests for detecting Adulterants. Food standards, laws and regulations to ensure safety of food	Lectures, Class discussions, Power Point presentations.	Detecting adulteration in foodstuffs- Ghee,honey,Tea and coffee,milk,haldi etc. (Practical)

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**Programme Name and Code-** Semester IV , Paper- IV

**Course Name and Code-** Dissertation/Project Work, HSFND404

### **Objectives**

The aim of dissertation is to develop skills in conducting a research study/ working in a project and learn the process of writing a dissertation/ project report

### **Course Learning Outcomes**

Student will be able to

1. Know the practical aspects of, collecting data/ project work
2. Evaluate, select and use appropriate strategies for reduction, analysis and presentation of data collected during research process/ project work
3. Suitably illustrate data/ insights using various graphical and other methods.
4. Prepare a dissertation document/ project report based on research process/ project work done.

**Students will be given an option of doing either**

- A) Dissertation or Project work in a chosen area congruent to their discipline/ field of study.
- B) The research will be an original work with plagiarism check and ethical clearance.

  


**Programme Name and Code-** Semester IV , Paper- V

**Course Name and Code-** Practical Related to Theory Papers , HSFNP405

S.No	Topics
1	Visit to food industries,Market survey and analysis of processed and finished products.
2	Menu planning for industrial canteen,hospital canteen,cafeteria,snack bar,residential hostel.
3	Visit to canteen attached to hospital and dietary department cafeteria, 3star hotel/restaurant , 5 star hotel/restaurant ,industrial canteen.
4	Management of cafeteria-Preparation, costing and fixing of price for meal items.
5	Market survey of Food service equipment.
6	Layout analysis of kitchens.
7	Preparation and Preservation any one given recipe-Jam,Jelly ,Pickles,Ketch-up,Chutneys,Avala Morava,Avala supari,Lime and orange squashes etc.
8	Making and selling of products where preservatives are used.
9	Detecting adulteration in foodstuffs-Ghee,honey,Tea and coffee,milk,haldi etc.
10	Food preparation,understanding the principle involved,nutritional quality and portion size. Snacks-pakoraa,cutlets,samosas,upma,poha,sandwiches.
	Beverages-Hot tea/coffee,Milk shake/lassi,fruit based beverages. Cereals-Boiled rice,pulao,chapatti,parantha,puri,pastas. Pulses-Whole,dehusked Vegetables-curries,dry preparations. Milk and milk products-kheer,custard Salads-salads and salad dressings.
11	Viva
12	Assignment and Record book.

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**Programme Name and Code-** Semester IV , Paper- Elective Course- I

**Course Name and Code-** Advanced Food Science, HSFNEC501

**Course objective:**

1. The course aims to enable students to acquaint with fundamentals of food processing technology and its process and to understand concepts of various engineering principles and processing methods.
2. To make the students aware about common food processing techniques and understand the physico-chemical properties of foods.

S.No		Credit	Hours
	<b>UNIT-1</b>		
1	<b>Processing and preservation by heat</b> <ul style="list-style-type: none"><li>• Principle, theory and effect of blanching, pasteurization, sterilization, UHT, canning, extrusion cooking and frying on food.</li></ul>		
	<b>UNIT-2</b>		
2	<b>Processing and preservation by low temperature</b> <ul style="list-style-type: none"><li>• Principle, theory and effect of refrigeration, chilling, freezing, freeze-drying (lyophilization) and freeze-concentration on food.</li></ul>		
	<b>UNIT-3</b>		
3	<b>Processing and preservation by non-thermal technologies</b> <ul style="list-style-type: none"><li>• Principle, theory and effect of irradiation, high pressure, pulsed electric field and other innovative technologies on food</li></ul>		
	<b>UNIT-4</b>		
4	<b>Processing and preservation by other methods</b> <ul style="list-style-type: none"><li>• Principle, theory and effect on food of drying, osmotic dehydration, concentration, evaporation and distillation, Hurdle technology</li></ul>		

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## Course Learning Outcomes:

Students will be able to-

1. Gain knowledge of principles of Unit operations involved in food processing industry.
2. Learn fundamentals of food processing technology and its process.
3. Understand concepts of various engineering principles and processing and preservation methods and their application.
4. Understand various post processing operations important from industrial point of view.

## References

- Mahindru, S N (2000) Food Additives- Characteristics Detection and Estimation. Tata Mc Graw Hill Publishing Co. Ltd
- Branen AL, Davidson PM & Salminen S. (2001) Food Additives. 2nd Ed. Marcel Dekker.
- Fellows P J (2002) Food Processing Technology- Principles and Practices, 2nd Edition. Woodhead Publishing Ltd.
- Food and Agriculture Organization (1980) Manual of Food Quality Control, Additive Contaminants Techniques. Rome
- Fuller, G.W. (1999) New Food Product Development. From concept to market place. CRC press, New York.

## Teaching Plan:

**Week 1:** Principle, theory and effect on food of blanching and pasteurization.

**Week 2:** Principle, theory and effect on food of sterilization, UHT and canning.

**Week 3:** Principle, theory and effect on food of extrusion cooking and frying.

**Week 4:** Principle, theory and effect on food of refrigeration and chilling.

**Week 5:** Principle, theory and effect on food of freezing and freeze-drying (lyophilization) .

**Week 6:** Principle, theory and effect on food of freeze-concentration .

**Week 7:** Principle, theory and effect on food of irradiation and high pressure.

**Week 8:** Principle, theory and effect on food of pulsed electric field and other innovative technologies.

**Week 9:** Principle, theory and effect on food of drying .

**Week 10:** Principle, theory and effect on food of concentration and evaporation .

**Week 11:** Revision Week .

**Week 12:** Presentations.



### Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	The course intends to provide knowledge of principles of Unit operations involved in food processing industry.	Lectures, discussions and visit	<ul style="list-style-type: none"> <li>• Assignment</li> <li>• Visit report</li> </ul>
2	Students will learn fundamentals of food processing technology and its process.	Lectures, discussions	<ul style="list-style-type: none"> <li>•Presentation/quiz</li> <li>•Practicals.</li> </ul>
3	The course will train students to understand	Lectures,	
	concepts of various engineering principles and processing and preservation methods and their application.	discussions	<ul style="list-style-type: none"> <li>•Presentation</li> <li>•Practicals</li> </ul>
4	To understand various post processing operations important from industrial point of view	Lectures, discussions	<ul style="list-style-type: none"> <li>•Presentation</li> <li>•Practicals</li> </ul>






**Programme Name and Code-** Semester IV , Paper- Elective Course- II

**Course Name and Code-** Nutrition Communication and Diet Counseling , HSFNEC502

**Objectives:**

1. Develop understanding regarding the vital aspects of communication and various Audio and Visual Media/Mass Media and their use in Nutrition and Health Education.

2. To equip students to understand the influence of counseling on disease management and identify components of counselling skills and to provide skills of counselling for specific disease conditions.

S.No	
	<b>UNIT-1</b>
1	<b>Basics of Communication</b> <ul style="list-style-type: none"><li>•Meaning of Communication, Forms of communication: Verbal and Non-verbal</li><li>•Communication Communication methods</li><li>•Traditional, Current and Emerging methods/tools of communication</li></ul>
	<ul style="list-style-type: none"><li>•Characteristics of effective communication, Skills and attributes of a communicator</li><li>•Approaches in communication</li><li>• Barriers to effective communication</li></ul>
	<b>UNIT-2</b>
2	<b>Nutrition Counselling</b> <ul style="list-style-type: none"><li>•Concept and importance of counseling in the nutrition care process</li><li>•Understanding dietary patterns and food choices and their impact on counseling</li><li>•Behaviour Change Communication and Models for behaviour change</li><li>•Counseling strategies</li><li>•Factors to be considered for counseling</li><li>•Conventional and non-conventional tools in counseling</li></ul>
	<b>UNIT-3</b>
3	<b>Processes involved in dietary counselling</b> <ul style="list-style-type: none"><li>• Managing resources of the communicator/counselor</li><li>• Designing of counseling plans – goals &amp; objectives, evaluation instruments.</li><li>•Implementation: facilitating self-management of disease condition<ul style="list-style-type: none"><li>•Evaluation: evaluating adherence to dietary changes</li></ul></li><li>•Counseling approaches after evaluation</li></ul>

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<b>UNIT-4</b>	
<b>4</b>	<p><b>Dietary counseling through the life span</b></p> <p>Considerations for counseling plans for:</p> <ul style="list-style-type: none"> <li>• Prenatal and pregnant women</li> <li>• Lactating women</li> <li>• Childhood nutrition problems like SAM, weight management, vitamin and mineral deficiencies, School children, adolescents, young adults</li> <li>• fitness, weight management, eating disorders, Managing diet</li> <li>• related chronic diseases in adults: Obesity, Diabetes, dyslipidemia, hypertension, cancer risk prevention, renal disease, liver disorders, Geriatric counselin.</li> </ul> <p><b>Nutritional/medicinal role of traditional foods: traditional food beliefs, role of Ayurveda, Naturopathy, Yoga and other traditional medicines in disease management</b></p>

**Course Learning Outcomes:**

The students will be able to:

Gain knowledge on the basics of communication strategies and best suited methods of communicating with individuals to select appropriate strategies presented with dietary problems.

1. Understand the importance of BCC in managing nutrition related problems .
2. Draw out a complete counseling plan for individuals based on their physiological conditions using the appropriate tools.
3. Understand how best to maintain adherence to changed dietary practices for specific physiological conditions.
4. Gain knowledge on traditional and alternate methods to manage disorders.




## References

- Mahan, L. K. and Escott Stump. S. (2016) Krause's Food & Nutrition Therapy 14th ed. Saunders-Elsevier
- Snetselaar L. (2009). Nutrition Counseling Skills for the Nutrition Care Process. Fourth Ed. Sudbury, Massachusetts: Jones Bartlett Publishers.
- Holli B Betsy and Betto A Judith. (2014). Nutrition Counseling and Education Skills for Dietetics Professionals. Sixth edition. USA: Lippincot Williams and Wilkins; Wolters Kluwer.
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- Midwinter R and Dickson J.(2015). Embedding Counseling and Communication Skills. A Relational Skills Model. Routledge 2015
- Devito Joseph A. (2015) Human Communication: The Basic Course. New York:Pearson
- King K and Klawitter B.(2007). Nutrition Therapy. Advanced Counseling Skills. Third Edition. Philadelphia, USA: Lippincot Williams and Wilkins; Wolters Kluwer. 2007

## Teaching Plan:

**Week 1:** Meaning of Communication, Forms of communication: Verbal and Non-verbal Communication, Communication methods: Intrapersonal, Interpersonal and Mass communication

**Week 2:** Traditional, Current and Emerging methods/tools of communication, Characteristics of effective communication, Skills and attributes of a communicator

**Week 3:** Approaches in communication: Informative, Educative, persuasive and prompting, Barriers to effective communication: physical, intellectual, emotional, environmental, cultural

**Week 4:** Meaning and concept and importance of counseling in the nutrition care process, Understanding dietary patterns and food choices and their impact on counseling.

**Week 5:** Counseling for behaviour change : Models for behavior change- Health belief model, Social Cognitive Theory, Theory of Planned behavior, Transtheoretical Model of Change

**Week 6:** Factors to be considered for counseling, Managing resources of the facilitator/counsellor, Designing of counseling plans – goals & objectives, planning client care and designing evaluation instruments.

**Week 7:** Implementation, Evaluation, Counseling approaches after assessment

**Week 8:** Considerations for counseling for Prenatal and pregnant women, Lactating women

**Week 9:** Considerations for counseling for Childhood nutrition problems and School children, adolescents, young adults

**Week 10:** Managing diet related chronic diseases in adults: Obesity, Diabetes, dyslipidemia , hypertension

**Week 11:** Considerations for counseling for Managing diet related chronic diseases in adults and geriatric counseling

**Week 12:** Nutritional/medicinal role of traditional foods: traditional food beliefs, role of Ayurve Naturopathy, Yoga and other traditional medicines in and disease management.

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### Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	To gain knowledge on the basics of communication strategies and best suited methods of communicating with individuals to select appropriate strategies presented with dietary problems	Discussion	Assignment on methods of communications
2	To understand the concept of BCC in nutrition	Discussion	Group discussions on theories of BCC
3	Draw out a complete counseling plan for individuals based on their physiological conditions using the appropriate tools	Discussion on overall plan with case studies	Practical preparation of counselling plans for a hypothetical situation
4	Understand how best to maintain adherence to changed dietary practices for specific physiological conditions.	Discussion on case studies for each condition	Student presentations , assignments and Group discussions
	To gain knowledge on traditional and alternate methods to manage disorders.		on various alternate methods of medicine in India.




**Programme Name and Code-** Semester IV , Paper- Elective Course- III

**Course Name and Code-** Applied Food Microbiology , HSFNEC503

**Objective:**

The course aims to provide knowledge of the microbial flora associated with food, role of microorganisms, microbiological safety of food, food borne pathogens and their toxins.

S.No	
	<p style="text-align: center;"><b>UNIT-1</b></p> <p><b>Microorganisms associated with Foods</b> Bacteria, Fungi, Yeasts and Viruses.</p> <p><b>Useful Microorganisms</b></p> <ul style="list-style-type: none"><li>• Food Cultures, Fermentation, Fermented products and role of microorganisms.</li><li>• Cultivation of microorganisms: Fermenter design and varioustypes of fermentation systems (submerged, surface and solid state); Fermentation substrates, Principles and production of enzymes, Baker’s yeast, vinegar.</li></ul>
	<p style="text-align: center;"><b>UNIT-2</b></p> <p><b>Food microbiological quality and safety</b></p> <ul style="list-style-type: none"><li>• Estimating number of microorganisms.</li><li>• ICMSF criteria for microbiological safety of food-Microbiological standards, Microbiological guidelines, Microbiological specifications. Microbiological criteria for various food products. ICMSF sampling plan: Two class plan, Three class plan.</li><li>• Repair and detection of micro organisms</li><li>• Indicators of food quality and food safety-Coliforms, Enterococci, Bifidobacteria, coliphages.</li></ul>
	<p style="text-align: center;"><b>UNIT-3</b></p> <p><b>Techniques for detection of pathogens associated with food</b></p> <ul style="list-style-type: none"><li>• Analysis of food for detection of Salmonella and E.coli.</li><li>• Rapid methods for detection of food borne pathogens and their toxins: ATP Photometry, Direct epifluorescent filter technique, Immunological Methods (Immunodiffusion, ELISA), Molecular method (PCR based).</li></ul>
	<p style="text-align: center;"><b>UNIT-4</b></p> <p><b>Waste disposal and Effluent treatment</b></p> <ul style="list-style-type: none"><li>• Identification of waste, Utilization and disposal of industrial wastes.</li><li>• Different methods of waste disposal.</li><li>• Contemporary technologies for management of waste</li></ul>

**Course Learning outcomes:**

Students will be able to

1. Understand the microbial flora associated with food and acquire knowledge on beneficial role of microorganism and relevance of microbiological safety of food.
2. Understand the conventional and rapid methods for detection of food borne pathogens and their toxins.
3. Understand the role of microbes in waste water treatment.



## References

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- Banwart GJ. (1987) Basic Food Microbiology . CBS Publishers and Distributors.
- Frazier WC, Westoff DC. (1998). Food Microbiology. 4th ed. Tata McGraw-Hill Publishing Co. Ltd.
- Garbutt J. (1997). Essentials of Food Microbiology. Arnold London.

## Teaching Plan

**Week 1:** Microorganisms associated with Foods, Useful Microorganisms.

**Week 2:** Useful Microorganisms

**Week 3:** Useful Microorganisms

**Week 4:** Food microbiological quality and safety

**Week 5:** Food microbiological quality and safety

**Week 6:** Food microbiological quality and safety

**Week 7:** Food microbiological quality and safety

**Week 8:** Food microbiological quality and safety

**Week 9:** Techniques for detection of pathogens associated with food

**Week 10:** Techniques for detection of pathogens associated with food

**Week 11:** Techniques for detection of pathogens associated with food

**Week 12:** Waste disposal and Effluent treatment

  


### Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understand the microbial flora associated with food.and Acquire knowledge on beneficial role of microorganism.	Lectures, discussions	Assignment, Presentation/quiz, Practicals
2	Understand the relevance of microbiological safety of food.	Lectures, discussions	Presentation , Practicals
3	Understand the conventional and rapid methods for detection of food borne pathogens and their toxins	Lectures, discussions	Presentation , Practicals
4	Understand the role of microbes in waste water treatment	Lectures, discussions and visit	Presentation , Practicals, Visit report

  


**Programme Name and Code-** Semester IV , Paper- Elective Course- IV

**Course Name and Code-** Food Processing Technology , HSFNEC504

**Course Objectives:**

1. To know processing technology of various food stuffs, physical and chemical principles in food processing and ways of quality control, waste disposal and sanitation in food industries.
2. To gain in depth knowledge of technological aspects involved in processing of cereals, bakery products, meat, fish, poultry ,eggs, milk and milk products and fruits and vegetable preservation.

S.No	
	<p style="text-align: center;"><b>UNIT-1</b></p> <p><b>Technology of cereals, Legumes and oils</b></p> <ul style="list-style-type: none"><li>• Introduction to Wheat: Structure, types/varieties, harvesting, physical &amp; chemical properties, composition and commercial value.</li><li>• Introduction to other cereals and millets: Rice, maize, oats, rye, corn, pearl millet; their nutritional importance and commercial value (Puffed rice, Rice flakes, parboiling of rice, extruded and fortified rice).</li><li>• Milling of wheat: Roller milling process, flour grade, flour treatments (bleaching, maturing), flour for various purposes, Products and By-products.</li></ul> <p><b>Introduction to Baking technology:</b> Types of bakery products, nutritional quality and safety of products, pertinent standards &amp; regulations.</p> <ul style="list-style-type: none"><li>• Bread, cakes, biscuits /crackers</li><li>• Breakfast cereals, macaroni products and malt.</li></ul>
	<p style="text-align: center;"><b>UNIT-2</b></p> <p><b>Technology of meat, fish, poultry, egg and their products</b></p> <p><b>Milk and milk products-</b> Introduction to market milk, Milk processing Milk products (Cream, butter, ice cream, curd, cheese, khoa and ghee)-Introduction, definition, classification, methods of manufacture, quality aspects.</p>
	<p style="text-align: center;"><b>UNIT-3</b></p> <p><b>Introduction to Fruits and Vegetables</b></p> <ul style="list-style-type: none"><li>• Classification of fruits and vegetables, general composition, enzymatic browning and its prevention.</li></ul>
	<p style="text-align: center;"><b>UNIT-4</b></p> <p><b>Preservation of fruits and vegetables</b></p> <p>Canning, Fruit Beverages, Jams, jellies and marmalades, Pickles, chutneys and sauces, Tomato products.</p>

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## Course Learning Outcomes:

Students will be able to

1. The course intends to provide knowledge of cereals and animal food processing.
2. Students will learn the processes and ingredients involved in breads, cakes and biscuit processing industry.
3. The course will train students to analyse all quality aspects of cereals and animal foods.
4. Students will gain knowledge of methods of preservation of meat, fish and poultry along with value added products from meat industry.
5. Understand various aspects of processing and quality of milk and milk products.
6. Ingrain the understanding of post-harvest management of fruits and vegetables. Gain in depth knowledge about processing and preservation techniques and quality aspects of fruits and vegetable.

## References

- Fabriani, G and Lintas C. (1988) Durum Wheat Chemistry and Technology. American Association of Cereal Chemistry Inc.
- Kent N L.(1993) Technology of Cereals. 4th Edi. Pergamon Press.
- Winton & Winton, (1991) Techniques of Food Analysis. Allied Scientific Publishers.
- De SK (2001) Outlines of Dairy Technology, Oxford University Press, New Delhi.
- Salikhe D K and Kadam SS (1995) Handbook of fruit science and technology. Production Composition, Storage and processing. Marcel Decker inc, New York.
- Siddapa, GS (1986) Preservation of Fruits and Vegetables, ICAR Publication.

## Teaching Plan

**Week 1:** Technology of cereals, legumes and oilseeds- introduction to wheat: structure, types/varieties, harvesting, physical & chemical properties, composition and commercial value.

**Week 2 :**Introduction to other cereals and millets: rice, maize, oats, rye, corn, pearl millet; their nutritional importance and commercial value.

**Week 3:** Milling of wheat: roller milling process, flour grade, flour treatments (bleaching, maturing), flour for various purposes, products and by-products.

**Week 4 :**Legumes and oilseeds: composition, anti-nutritional factors, processing and storage; processing for production of edible oil, meal, flour.

**Week 5:** Introduction to baking technology: types of bakery products, nutritional quality and safety of products, pertinent standards & regulations.

**Week 6 :**Bread: Role of ingredients & processes, equipment used, product quality characteristics, scoring of quality parameters, faults and corrective measures.

**Week 7:** Cakes: role of ingredients & processes, equipment used, product quality characteristics, scoring

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of quality parameters, faults and corrective measures.

**Week 8:** Biscuits /crackers: role of ingredients & processes, equipment used, product quality characteristics, scoring of quality parameters, faults and corrective measures.

**Week 9:** Breakfast cereals, macaroni products and malt . Production and quality of breakfast cereals and macaroni products.

**Week 10 :**Technology of meat, fish, poultry, egg and their products- meat: composition, variety, pre-slaughter handling,

**Week 11:** Introduction to market milk-Indian standards, Composition, factors affecting composition of milk, Physico-chemical properties of milk and its constituents. Milk products (Cream, butter, ice cream, curd ,Cheese, khoa and ghee)-Introduction, definition, classification, methods of manufacture, quality aspects.

**Week 12:** Classification of fruits and vegetables, general composition, enzymatic browning and its prevention. Jams, jellies and marmalades: Introduction, Jam: Constituents, selection of fruits, processing & technology. Jelly: Essential constituents (Role of pectin, ratio), Theory of jelly formation and defects in jelly.

**Week 13:** Pickles, chutneys and sauces: Processing, Types, role of ingredients, causes of spoilage. Tomato products: Selection of tomatoes, pulping & processing of tomato juice, Tomato puree, paste, ketchup, sauce and soup.

#### Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Imparting knowledge of processing, quality and technology of cereals, legumes and oilseeds	Lectures, discussions and visit to cereals processing industry	<ul style="list-style-type: none"> <li>•Assessment of quality of cereals-practical based</li> <li>•Visit report</li> </ul>
2	Learning baking technology of breads, cakes and biscuits with focus on industrial production of these products.	Lectures, discussions based on industrial uses/ industrial processing	<ul style="list-style-type: none"> <li>•Presentation/quiz</li> <li>• Practicals on quality aspects of baked products</li> </ul>
3	Learning technological aspects of processing of meat, fish, poultry and eggs.	Lectures, discussions,	<ul style="list-style-type: none"> <li>•Presentation</li> <li>•Practicals on quality</li> </ul>
4	<ul style="list-style-type: none"> <li>•Introduction to market milk and processing of milk products.</li> <li>•Learning techniques of preservation of fruits and vegetables</li> </ul>	Lectures, discussions and visit to milk industry Lectures, discussions based on industrial uses/processing of fruits and vegetables	<ul style="list-style-type: none"> <li>•Assignment on milk</li> <li>•Visit report</li> <li>•Presentation/quiz on fruits and vegetables</li> </ul>

**Programme Name and Code-** Semester IV , Paper- Elective Course- V

**Course Name and Code-** Nutrition for Fitness and Sports , HSFNEC505

**Course Objectives**

1. To learn the concepts of fitness, methods of assessing fitness, exercises for physical fitness and bioenergetics of exercise and role of macro- and micro-nutrients in sports performance and to gain knowledge & application skills with respect to nutrition for high performance sports, through the life-cycle and diet & nutritional care of special groups of athletes.

2. To enable the students to know the recent techniques of body composition and energy metabolism for the assessment of nutritional status.

S.No		Credit	Hours
1	<b>UNIT-1</b>		
	<b>Introduction to physical fitness</b> <ul style="list-style-type: none"><li>• Definition of physical fitness</li><li>• Components of physical fitness</li><li>• Methods of assessing physical fitness</li><li>• Approaches to achieving physical fitness through the life cycle</li></ul>		
2	<b>UNIT-2</b>		
	<b>Fundamentals of Sports Nutrition:</b> <ul style="list-style-type: none"><li>• Integrated approach to care for athletes</li><li>• Assessment of Sports performance</li><li>• Bioenergetics and body metabolism of physical activity and sports</li><li>• Macro- and micro nutrients for sport performance</li><li>• Temperature regulation, fluid balance, fluid requirements of athletes and rehydration strategies for sports</li></ul>		

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	<b>UNIT-3</b>		
<b>3</b>	<b>Nutrition for high performance athletes:</b> <ul style="list-style-type: none"> <li>• Recommended allowances and nutritional guidelines for different categories of high performance sports</li> <li>• Nutritional care during Training, weight management and day-today recovery</li> <li>• Nutrition for the Pre-competirion, Competition and post competition recovery phase</li> <li>• Supplements in Sport :performance enhancing substances ,drugs, ergogenic aids and herbs in sports performance</li> </ul>		
	<b>UNIT-4</b>		
<b>4</b>	<b>Challenges in Sports Nutrition:</b> <ul style="list-style-type: none"> <li>• Nutritional care for children and adolescent athletes</li> <li>• Athletes with special needs- Paralympics &amp; special Olympics, vegetarian athletes,</li> <li>• Athletes with eating disorders, athletes with diabetes and other medical conditions , management of Red-S.</li> </ul>		

**Course Learning Outcomes:**

Students will be able to:

1. Understand concepts of fitness, its assessment and exercises for physical fitness training.
2. Function effectively as a sports dietitian, with knowledge and skills, to support recreational and competitive athletes
3. Exhibit knowledge of the metabolism and bioenergetics of exercise and continuum in various sports
4. Successfully plan, implement and monitor sport-specific diets for athletes through all age groups
5. Provide diet and nutritional care in terms of nutrition education, diet plans and counselling to special groups of athletes .

**References**

- Mahan, L. K. and Escott Stump S. (2016) Krause’s Food & Nutrition Therapy. 14th ed. Saunders-Elsevier.
- Burke LM and Deakin V. (2002) Clinical Sports Nutrition, 2nd edition, Publishers McGraw Hill
- Dan Benardot. (2011) Advanced Sports Nutrition-2nd Edition.
- Fink H H and Mikesky A E. (2017) Practical Applications in Sports Nutrition 5th Edition.

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**Teaching Plan:**

**Week 1:** Definition of physical fitness, Components of physical fitness, Methods of assessing physical fitness

**Week 2:** Approaches to achieving physical fitness through the life cycle, Assessment of Sports performance

**Week 3:** Bioenergetics and body metabolism of physical activity and sports

**Week 4:** Macro- and micro nutrients for sport performance

**Week 5:** Temperature regulation, fluid balance, fluid requirements of athletes and rehydration strategies for sports

**Week 6:** Recommended allowances and nutritional guidelines for different categories of high performance sports

**Week 7:** Nutritional care during Training, and day-to-day recovery

**Week 8:** Nutrition for the Pre-competition, Competition and post competition recovery phase

**Week 9:** Weight management in athletes

**Week 10:** Supplements in Sport :performance enhancing substances ,drugs, ergogenic aids and herbs in sports performance

**Week 11:** Nutritional care for children and adolescent athletes, Athletes with special needsParalympics & special Olympics, vegetarian athletes,

**Week 12:** Managing athletes with eating disorders , and Red-S., Dietary care for athletes with diabetes and other medical conditions.

**Facilitating the achievement of Course Learning Outcomes:**

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Develop concepts of physical fitness, its components, skills in assessment and exercises to improve physical fitness	Various fitness exercises and assessments in groups	Assessment scores of partners' physical fitness. •Test on the topic
2	Exhibit knowledge of metabolism & nutritional care for athletes and demonstrate skills of assessing sports performance	Demonstration and discussion	Test on knowledge domain

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<b>3</b>	Develop in- depth understanding and critically evaluate and apply nutritional recommendations for different categories athletes, during various phases and a comprehensive view on supplements in Sport	Presentations, discussions and surveys	Class assignments, scrap books, survey reports and diet plans
<b>4</b>	Understand comprehensively, needs of children, adolescents and special groups in sports training	Discussion	Diet plans for junior athletes and athletes with special needs

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