



**Pt. Ravishankar Shukla University,
Raipur (C.G.), India 492010**

**CURRICULUM & Syllabus
(Based on CBCS & LOCF)**

M.Sc.-Food Science and Nutrition

Home Science

(Semester System)

Semester: I-IV

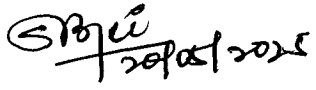
Session: 2025-27

टीप- सत्र 2024-25 के पाठ्यक्रम को सत्र 2025-27 के लिए यथावत प्रभावशील किया जाता है।

Approved by :

Board of Studies : Faculty of Home Science

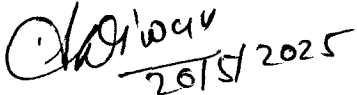
Dates : 20th May 2025

Name of Chairman : Dr. Shipra Banerjee 

Name of Member's : Dr. Saroj Prasad

Dr. Rekha Diwan 

Dr. Kalpana Jadhav

Dr. Aarti Diwan 

PROGRAMME: M.Sc. (HOME SCIENCE) FOOD SCIENCE AND NUTRITION
PROGRAMME CODE: MSCFN

The faculty of Home Science and Centre for Research is committed to provide an enriched educational experience to develop the knowledge, skills and attributes of students to equip them for life in a complex and rapidly changing world. On completion of M.Sc. (Food Science and Nutrition) our students should be able to demonstrate the programme outcomes listed below:

PO-1	Discipline Knowledge: Demonstrate a mastery of the fundamental knowledge and skills required in the discipline to function effectively as an entry-level professional in the field.
PO-2	Scientific Approach: Experiment with new approaches, challenge existing knowledge boundaries and take informed action to solve problems related to society. Identify, define, and deal with problems through logical, analytical and critical thinking acquired from different domains of knowledge. Investigate the potential applications of learning in the discipline and become meticulous and systematic in scientific enquiry.
PO-3	Critical thinking: Analytical reasoning and Problem solving: Ability to employ critical thinking in identifying the problem, developing analytical skills and capabilities to resolve the problems efficiently related to all the five specific areas on a tailor-made basis for a client, customer, an individual, family and society either independently or with the support of concerned authorities.
PO-4	Research and Scientific reasoning: Skills in undertaking small researches by way of Term paper, Case Studies, Market Surveys, Field visits, Laboratory Experiments etc. on the related topics/ problems of the discipline and arrive at the results based on the scientific reasoning wherever applicable. Find out new methods and technologies to care for nature and life for sustainable development.
PO-5	Cooperation/ Team Work: Capability of working enthusiastically and united with the working teams in organizing events in the Department/ Faculty/ University/ Community, and accomplishing group work/ assignments / tasks by willing cooperation of all and well-coordinated group living through during educational visits.
PO-6	Reflective thinking: Ability to practice empathy and objectivity in dealing with the personal and community interactions and problems. Become Confident, responsible, autonomous and critically reflective lifelong learners
PO-7	Digital Literacy: Competency in accessing relevant and authentic information and data from electronic media with a motive to learn and synthesize it on the given topics in Home Science discipline for academic and extension work presentation and to prepare computer aided designs by using the needed software's.
PO-8	Self-directive learning: Potential to complete the assigned projects successfully either at Residential / Commercial level or Community level by managing the resources

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	independently and wisely.
PO-9	Multicultural competence: Ability to learn about different cultures by way of practicing traditions, traditional cooking, ethnic designing and stitching, developing itineraries, and making traditional arts.
PO-10	Effective Citizenship: Responsible for learning, develop honesty in work and respect for self and others. Function effectively as an individual member or leader in diverse teams and in multidisciplinary settings towards the development of the society or nation

PROGRAMME SPECIFIC OUTCOMES

PSO1	Develop competence in public health nutrition & nutrient analysis of foods and new product development.
PSO2	Acquire skills to practice as a dietician or nutritionist in a national or international government programmes / clinical setting /health club/community setting/sports organization.
PSO3	Demonstrate the ability as an entrepreneur and skills to establish a food service outlet.
PSO4	Apply the theoretical knowledge acquired for a job in the food industry. Commitment to social responsibility and ability to take up leadership roles
PSO5	Adopt true professionalism in the work environment
PSO6	Enhance academic competence to pursue teaching as a profession and undertake research in the area of food and nutrition.
PSO7	Attain better vision for research, communication, interpersonal relations.
PSO8	Acquire ability to handle stressful conditions
PSO9	Ability of decision making in normal and adverse condition
PSO10	Acquire aesthetic sense and become more artistic and creative
PSO11	Confidence to face the world and readiness to accept change at each level.

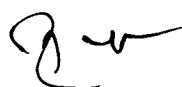
MSc. FOOD SCIENCE AND NUTRITION

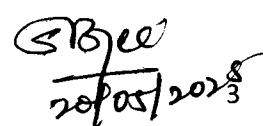
Specification of course	Semester	No. of Courses	Credits
Core	I-IV	16	80
Elective	III-IV	4	20
Total		20	100

Additional Courses (Qualifying in nature, for Student admitted in School of Studies only)

Generic Elective	II-III	02	06
Skill Enhancement (Value Added Courses)	III- IV	01	02
Indian Knowledge System (IKS)	I	01	02






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**M. Sc. (HOME SCIENCE) FOOD SCIENCE AND NUTRITION
PROGRAM STRUCTURE**

Semester	Course Nature	Course Code	Course Title	Course Type (T/P)	Hrs/ Week	Credits	Marks		
							CIA	ESE	Total
Semester -I	Core	MSCFN110	Research Methodology	T	5	5	30	70	100
	Core	MSCFN120	Physiology	T	5	5	30	70	100
	Core	MSCFN130	Food Microbiology	T	5	5	30	70	100
	Core	MSCFN140	Problems in Human Nutrition	T	5	5	30	70	100
	Core	MSCFN150	Practical Nutrition & Food Microbiology	P	10	5	30	70	100
Total						25	30	70	500
Semester -II	Core	MSCFN210	Statistics and Computer Application	T	5	5	30	70	100
	Core	MSCFN220	Food Science	T	5	5	30	70	100
	Core	MSCFN230	Food Chemistry	T	5	5	30	70	100
	Core	MSCFN240	Therapeutic Nutrition	T	5	5	30	70	100
	Core	MSCFN250	Practical (Food Science and Therapeutic Nutrition)	P	10	5	30	70	100
Total						25	30	70	500
Semester -III	Core	MSCFN310	Advanced Nutrition	T	5	5	30	70	100
	Core	MSCFN320	Nutritional Biochemistry	T	5	5	30	70	100
	Elective- (Select any one)	MSCFN330A (Elective)	Nutrition for health of women and children	T	5	5	30	70	100
		MSCFN330B (Elective)	Fundamentals of food and Nutrition Science	T	5	5	30	70	100
	Core	MSCFN340	Methods of Investigation	T	5	5	30	70	100
	Core	MSCFN350	Practical (Nutritional Biochemistry)	P	10	5	30	70	100

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Total						25	30	70	500
Semester -IV	Core	MSCFN410	Nutrition for Health and Fitness	T	5	5	30	70	100
	Core	MSCFN420	Public Nutrition	T	5	5	30	70	100
	Elective- (Select any one)	MSCFN430A (Elective)	Nutrient Deficiencies and Assessments	T	5	5	30	70	100
		MSCFN430B (Elective)	Geriatric Nutrition	T	5	5	30	70	100
	Core	MSCFN440	Institution Management	T	5	5	30	70	100
	Core	MSCFN450	Practical (Institutional Management / or Dissertation)	P	10	5	30	70	100
Total						25	30	70	500

COURSE OUTCOMES

Course Code	Course Name	Course Out Comes
FN110	Research Methodology	Enable to understand the basics of research and its applicability
		Explore the types, tools and methods of research
		Develop the ability to construct data gathering instruments appropriate to the research Design
		Appreciate and understand importance of writing scientifically
		Understand the types and characteristics of research design
		Familiarize with the concepts of reliability and validity in research
FN 120	Physiology	Understand different organs and how they work in the body.
FN 130	Food Microbiology	Understand different microorganisms and how they are good and bad for the human.
FN 140	Problems in Human Nutrition	Understand Different types of problems and their solutions regarding human nutrition.
FN 150	Practical (Nutrition and Food Microbiology)	Understand Therapeutic diets and food spoilage ,good and bad effects of microorganism.
FN 210	Statistics and computer application	Understand the analysis of research data of and its application
		How to calculate mean, mode median
		students will able to do presentation of data
		learn all about computer working, windows, ppt
FN 220	Food Science	Understand the basics theoretical concepts of laboratory

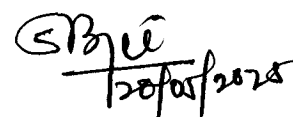
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		settings and all major steps involved in research
FN 230	Food chemistry	Enable to understand how food assimilates and works inside the body
FN 240	Therapeutic Nutrition	Understand Dietary treatments for different diseases
FN 250	Practical (Food Science and Therapeutic Nutrition)	Explore the preparation and planning of different diseases
FN 310	Advanced Nutrition	Understand the current advance in the field of nutrition and its applicability
FN 320	Nutritional Biochemistry	Biochemistry of food and their reaction and inter reaction in the body
FN 330 A	Nutrition for Health of women and children (Elective)	Understand the concept of positive health and its dimensions and various ways of acquiring fitness
FN 330 B	Fundamentals of Food and Nutrition Science (Elective)	Revised Knowledge of Basics of Nutrition science
FN 340	Methods of Investigation	Understand the concept of methods used in assessment of food quality
FN 350	Practical (Nutritional Biochemistry)	Understand the methods and techniques of biochemistry
FN 410	Nutrition for Health and fitness	Understand the concept of health fitness and nutrition.
FN 420	Public Nutrition	Understand the concept of public nutrition and health, its working and communication for health promotion
FN 430 A	Nutrient Deficiencies and Assessment (Elective)	Understand the concept of deficiency diseases and methods of assessment
FN 430 B	Geriatric Nutrition (Elective)	Understand the concept of old age problems and their solution.
FN 440	Institution Management	Understand the management techniques of food management of institutions.
FN 450	Practical (Institutional Management/ Dissertation)	Understand practically the concept of institution Management





COURSE OUT COME

MSc. FOOD SCIENCE AND NUTRITION

SEMESTER I

M.Sc. (HSc.) FSc.&N SEM I	Paper I	Research Methodology	Understand the analysis of research data of and its application mean, mode median Students will able to do presentation of data learn all about computer working, windows, ppt
	Paper II	Physiology	Understanding of Basic Physiological Principles Knowledge of Organ Systems Application of Physiological Knowledge
	Paper III	Food Microbiology	Microbial Ecology in Food: Foodborne Pathogens and Spoilage Organisms Microbial Control Food Safety and Quality Control Food Fermentation
	Papper IV	Problems in Human Nutrition	Understanding Nutritional Needs Impact of Nutrition on Health Nutritional Assessment Malnutrition Nutrition in the Life Cycle
		Practical (Nutrition & Food Microbiology)	Understand therapeutic diets and food spoilage, good and bad effects of microorganism.

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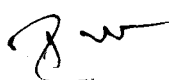
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CONTENT OF THE COURSE SEMESTER I PAPER I- RESEARCH METHODOLOGY COURSE CODE MSCFN 110		
Unit	Subject	Hours
1.	Science, scientific methods and approach. Social research and survey: Meaning, definition, nature, scope, objects, types. Distinction between social survey and research. Pretesting and pilot survey. Hypothesis: Definition, source, characteristics, importance, main difficulties in the formation of hypothesis, disadvantage	10 hours
2.	Source of data: Primary and secondary sources. Methods or techniques of data collection Observation Interview Schedule Questionnaire Case-study	10 hours
3.	Sampling: Meaning, characteristics, advantages and disadvantages. Types of Sampling Random Sampling Purposive sampling Stratified sampling Other sampling method Classification and tabulation of data Analysis and interpretation of data.	10 hours
4.	Research design-steps and process of its formulation. Types of research design Exploratory, Descriptive, Diagnostic and Experimental. Diagrammatic presentation of data.	10 hours

References

- Babbie, E. (2010). The practice of social research (12th ed.). Belmont, CA: Wadsworth.
- Esterberg, K. G. (2002). Qualitative methods in social research. Boston, MA: McGraw-Hill.
- Garfinkle, H. (1967). Studies in ethnomethodology. Englewood Cliffs, NJ: Prentice Hall.





- Gubrium, J. F., & Holstein, J. A. (2000). Analyzing interpretative practice. In N. Denzin & Y.S. Lincoln (Eds.), The handbook of qualitative research (2nd ed.), (pp. 487-508). Thousand Oaks, CA: SAGE Publications.
- Heritage, J. C. (1984). Garfinkel & ethnomethodology. Cambridge: UK. Polity Press.
- Krippendorff, K. (2004a). Content analysis: An introduction to its methodology (2nd ed.). Thousand Oaks, CA: Sage

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CONTENT OF THE COURSE SEMESTER I PAPER II - PHYSIOLOGY COURSE CODE MSCFN 120		
Unit	Subject	Hours
1.	Cell structure and functions: Levels of cellular organization and function - organelles, tissues, organs and systems brief review. Cell membrane, transport across cell membrane and intercellular communication. Regulation of cell multiplication. Nervous system: Review of structure and function of neuron, conduction of nerve impulse synapses, role of neurotransmitters Organization of central nervous system structure and function of Brain and spinal cord, Afferent and efferent nerves, Hypothalamus and its role in various body function, obesity, sleep, memory.	10 hours
2.	Endocrine system: Endocrine glands- structure, function, role of hormones, regulation of hormonal secretion, Disorders of endocrine gland. Emphasis on physiology of diabetes and stress hormones. Sense Organs: Review of structure and function, Role of skin, eye, ear, nose and tongue in perception of stimuli. Digestive system: Review of structure and function. Secretary, Digestive and Absorptive function. Role of liver, pancreas and gall bladder and their dysfunction.	10 hours
3.	Respiratory system: Review of structure and function. Role of lungs in the exchange of gases, Transport of oxygen and CO₂. Role of Hemoglobin and buffer systems. Respiratory quotient, hypoxia, and asthma The circulatory system: Structure and function of heart and blood vessels. Regulation of cardiac output and blood pressure, heart failure, hypertension. Blood formation, composition, blood clotting and homeostasis: Formation and function of plasma proteins, Erythro poesis, Blood groups and his to compatibility. Blood indices. Use of blood for investigation and diagnosis of specific disorders Anemia.	10 hours
4.	The Musculo skeletal system: Structure and function of bone, cartilage and connective tissue, Disorders of the skeletal system, Types of muscles structure and function. The excretory system: Structure and function of nephron. Urine formation. Role of kidney in maintaining pH of blood. Water, electrolyte and acid base balance, diuretics. Immunity system: Cell mediated and hormonal immunity. Activation of WBC and production of antibodies. Role in inflammation and defense Physiological changes in pregnancy.	10 O ur s

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References

- Ganong W.F. 1985: Review of Medical Physiology 2nd Edition, Lange Medical Publication. Moan Camcell E.J. Dickinson C.J Edwares C.R.N. and Sikora K. (1984): Clinical Physiology, 5th Edition Publication. Guyton A.C. (1985):
- Guyton. A.C. and Hall, J.B. (1996) Text Book of Medical Physiology, 9th Edition, W.B. Saneers Company... Books Pvt. Ltd. Banglore. Wilson KTW and Waugh A (1998): Ress and Wilson Antony and Physiology in Health and 4th Edition
- Mc. W.D. Karen F.J. and Katch, V.L. (1996): Excericise Physiology, Energy ,.....perfor-
mance, 4th Edition, Williams and Wilkons Batimere Jain A.K. Text Book of Physiiology,
Vol I and II Avichal Publishing Co. New Delhi.

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**CONTENT OF THE COURSE
SEMESTER I**

PAPER III- FOOD MICROBIOLOGY

COURSE CODE MSCFN 130

Unit	Subject	Hours
1.	Bacterial morphology, structure, staining, culture media, culture method and identification of bacteria. Growth and Nutrition of Bacteria: Intrinsic and extrinsic parameters that affect microbial growth. Microorganism important in food microbiology - Mold, yeast, bacteria.	10 hours
2.	Contamination of foods. Spoilage of different groups of foods: Cereals and cereal products Vegetables and fruits Fish and meat products Meat and meat products Eggs and poultry Milk and milk products Canned foods	10 hours
3.	Foods in relation to disease: Food borne illness: Bacterial and viral food borne disorders. Food borne important animal parasites, mycotoxins. Food Preservation: General principles of food preservation: Asepsis, removal of micro-organism, maintenance of anaerobic conditions. -Preservation by use of high temperature. -Preservation by use of low temperature -Preservation by drying. -Preservation by food additives - Preservation by radiation	10 hours
4.	Fermented Foods: Role of microbes in fermented foods – - Fermented dairy products - Fermented vegetables - Fermented meat - Fermented fish - Beverage and distilled products. Indices of Food Sanitary Quality: Microbial criteria of food, Microbial standards and food safety. Controlling the microbial quality of foods - Quality control using microbial criteria. The HACCP (Hazard Analysis and Critical Control Point) system	10 Ours

References

- Atlas, M. Ronald (1995) principles of Microbiology, 1th Edition Mosby-year Book, Inc., Missouri, U.S.A.

- Topley and Wission's (1983) Principles of Bacteriology, Virology and Immunity, Edited by S.G. Wilson, A. Miles and M.T. Parkar, Vol.I General Microbiology and Immunity, II: Systematic Bacteriology, 7th Edition, Edward Arnold Publish.
- Block, J.G. (1999) Microbiology Principles and Exportations, 4th Edition John Wiley and Sone Inc.
- Jay, James, M. (2000) Modern Food Microbiology, 6th Edition, Aspen publishers, Inc., Maryland.
- Bansart, G. (1989) Basic Food Microbiology, 2th Edition, CBS Publisher. Garbutt, J (1977) Essentials of Food Microbiology, 1st Edition, Arnold International Students Edition.
- Doyle, P. Benehat, L.R. and Mantville, T.J. (1977): Food Microbiology, Fundamentals and Forntiers, ASM Press, Washington DC. Bensaon, H.J. (1990) Microbiological applications, C. Brown Publishers U.S.A. Roday, S. (1999) Food Hygiene and sanitation, 1st Edition, Tata Mcgraw Hillll, New Delhi. Venderzant, C and D.F. splitts Toesser (1992): Compendium of Methods for the Microbiological Examination of Foods 3rd Edition. American Public Health Association, Washington D.C.
- Frazier, W.C. and Westhoff, D.C. (1998) : Food Microbiology. Tata McGraw Hill Book Company, New Delhi, 4th Edition.
- James, M.J. (1987) : Modern Food Microbiology, CBS Publishers, New Delhi, 3rd edition. Pelezar, M.I. and Reid, RD. (1993) : Microbiology, McGraw Hill Book Company, New York, 5th edition.
- Adams, M.R., Moss, M.O. (1995): Food Microbiology, New Age International (P.) Ltd., Delhi.

CONTENT OF THE COURSE
SEMESTER I

PAPER IV- PROBLEMS IN HUMAN NUTRITION

COURSE CODE MSCFN 140

Unit	Subject	Hours
1.	Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients. Identification of high-risk patients. Assessment of patient need based on interpretation of patient data (Clinical, biochemical, biophysical, personal etc.) Nutritional support service: Recent advances in techniques and feeding methods. (enteral nutrition, parental nutrition) pre- and post-operative diets, Diet in burns.	10 hours
2.	Weight imbalance– Obesity – Types, etiology, assessment, treatment, diet and other measures, complications of obesity Under weight – Causes, dietetic management Neurological disorders Neuritis – Etiology, nutritional care. Migraine – Symptoms & Dietary management Anorexia Nervosa – Etiology, treatment	10 hours
3.	Diet in genetic disorders: Fructosuria, Galactosemia, Phenylketonuria. Musculoskeletal disorders: Gout – Characteristics, nutritional care Cancer: types of cancer, Nutritional effect of cancer, Nutritional disorders related to treatment, Nutritional care in cancer.	10 hours
4.	Prevalence, etiology, clinical manifestation, preventive and therapeutic measures for the following- Vitamin A Deficiency IDD Rickets Dental carries: Etiology, nursing bottle carries. Nutrition in AIDS.	10 hours

References:





- Nutrition Science (Multi Colour Edition)– B.Srilakshmi
- Dietetics – (Multi Colour Edition)– B.Srilakshmi
- Nutrition and Dietetics Fourth Edition, Shubhangini A. Joshi
- Food, Nutrition and Diet Therapy By Krause
- Dr. M. Swaminathan, Advanced Textbook on Food & Nutrition Volume-1&2 ISBN-13: 978-9339220150 ISBN-10: 9789339220150

CONTENT OF THE COURSE SEMESTER I

PRACTICAL- 1 NUTRITION AND FOOD MICROBIOLOGY

Objectives

The aim of the course is to:

Familiarize students with basic techniques used in Studies and Research in Nutritional Sciences. Acquaint students with the methods of estimating nutrient requirements. Orient students towards planning of metabolic studies.

Note: Any 10 practical's from 'Part I' and any 5 practicals from 'Part II'.

PART-I

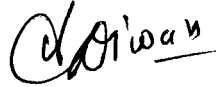
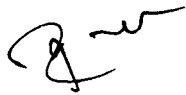
1. Estimation of protein quality using different methods PER, B.V., N.P.U., NDP-Cal%
2. Estimation of energy value of food stuffs using bomb calorimeter.
3. Estimation of Energy Requirements.
4. B M R.
5. Energy expenditure on physical activities.
6. Factorial approach.
7. Balance studies – Nitrogen balance.
8. Assessment of micronutrient status- Iron, Vitamin 'C', Vitamin 'A', Vitamin from 'B' Complex group.
9. Bioavailability of selected nutrients
10. Assessment of nutritional status including Body composition.
11. Physiological parameters like heart rate and blood pressure
12. Assessment of coronary risk profile- RISK factor
13. Assessment of bone health
14. Planning diets and formulating dietary guide lines
15. Fitness and health
16. Prevention of chronic degenerative disorders
17. Obesity management
18. Management of diabetes mellitus and CVD
19. Review of existing alternative diet related systems for physical fitness and health.
20. Planning and preparation of diets for the elderly in health and sickness.

Part II





1. Preparation of common laboratory media and special media for cultivation of bacteria, yeast and moulds.
2. Staining of bacteria- grams staining, spore, capsule, motility of bacteria, staining of yeast and moulds.
3. Identification of important moulds and yeasts (slides).
4. Study of environment around us as source of transmission of microorganisms in food.
Assessment of surface Sanitation of food preparation units.
5. Bacteriological analysis of milk.
6. Demonstration of available rapid methods, diagnostic kits used in identification of microorganisms or their products.
7. Visits to food processing units or any other organization dealing with advance methods in food microbiology



FOOD SCIENCE AND NUTRITION
M.Sc.- II SEMESTER
PART- I THEORY
PART II-PRACTICAL

PART III - INTERNSHIP / FIELD PLACEMENT

The student will be required to undergo an internship/field placement for a total duration of six to eight weeks in their chosen area of interest after IIInd semester which will facilitate their pursuing a professional career in same field. This programme could be taken up either as a single block or in two different blocks. It is mandatory that the organization / institution (public/private) participating in the field. Placement programme will be of good professional standing. The list may include Hospitals, state run NGO, Food industry, etc. The student will be required to submit and present a report of the internship/field placement project after its completion. It is also envisaged that participating organization/institution will give their performance appraisal of the student work.

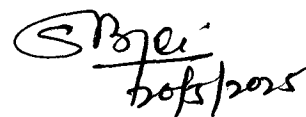
Grade A (60% and above),

Grade B (48% to 59%),

Grade C (40% to 47%) should be given to the student after evaluation of field placement/ internship report by the department. The grade will be mentioned in the mark sheet of the IVth Semester of the student.

Excursion trip/field visits should be arranged regularly by the department for the up liftment of the knowledge of the students. This programme is designed with the following objectives:

- To enable the students to acquire an in-depth understanding of the practical aspects of knowledge and skills acquired during the course in the relevant subject/subjects.
- To gain hands on experience for higher proficiency in their selected area of expertise
- To help the students to develop and have their analytical abilities for situation and analysis and bringing about improvements.


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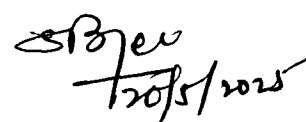
COURSE OUT COME

MSc. FOOD SCIENCE AND NUTRITION

SEMESTER II

M.Sc. (HSc.) SEM II	Paper V	Statistics and computer Application	Understanding programming concepts and applying them to solve statistical problems. Using computer software to clean, transform, and analyse data. Understanding and using database management systems (DBMS).
	Paper VI	Food Science	Provide an understanding of composition of various foodstuffs. Familiarize students with changes occurring in various foodstuffs as a result of processing and cooking. Enable students to use the theoretical knowledge in various applications and food preparations.
	Paper VII	Food Chemistry	Understanding Food Composition Relating Structure to Function Understanding Chemical Reactions in Foods Applying Analytical Techniques Understanding Food Quality and Safety
	Papper VIII	Therapeutic Nutrition	To manage and treat specific medical conditions by modifying dietary intake to support recovery and improve overall health. Therapeutic diets can help rest or support specific organs by regulating nutrient intake and adjusting the type and amount of food consumed.
		Practical	Food Science and Therapeutic Nutrition





CONTENT OF THE COURSE
SEMESTER II

PAPER V- STATISTICS AND COMPUTER APPLICATION

COURSE CODE MSCFN 210

Unit	Subject	Hours
1.	Statistics: Meaning, Definition, Scope, importance, characteristics, distrust of statistics Measurement of Central tendency: – Mean – Median – Mode	10 hours
2.	Graphic presentation of Data: Importance, types – Histogram, Frequency polygon, Frequency curve Correlation: Definition, Meaning and types, Methods of determining coefficient of correlation – Product moment method, Rank correlation Mean deviation, Standard deviation, Quartile deviation	10 hours
3.	Introduction to computers: Definition, Characteristics, components of computer system, block - diagram of computer. CPU, I/O devices and memory (RAM and ROM) , secondary storage devices (Hard disk, floppy disk, magnetic tape etc.) Analysis of variance -One way method: Direct and shortcut.	10 hours
4.	Computer generations. Classification of computer: Analog, digital, hybrid, general and special purpose computers. Types of Computer: Micro, mini, mainframe and super computer. Chi- square test and goodness to fit. Application of student 't' test for small samples. Working with MS - word : Getting started with word, formatting text and paragraph, Applying text and language tools, Designing pages with columns and tables, - using graphics.	10 hours

References

- Field, A. (2005). Discovering statistics using SPSS. 2ndEd. London: Sage Publications.
- Mann, Prem. (2001). Introductory statistics. 4th Ed. Upper New York: John Wiley &

CONTENT OF THE COURSE
SEMESTER II

PAPER VI- FOOD SCIENCE

COURSE CODE MSCFN 220

Unit	Subject	Hours
1.	Water- structure and Physical properties of water and ice and chemical nature, adsorption phenomena, types of water solution and colligative properties. Free bound water, water activity and food spoilage. Food dispersion – Colloidal sol, stabilization of colloidal systems, Rheology of food dispersion. Gels: Structure, formation, strength, types and permanence. Emulsion: Formation, stability, surfactants and emulsifiers. Foams: Structure, formation and stabilization.	10 hours
2.	Polysaccharides, sugars and sweeteners Starch: Structure, Gelatinization, Characteristics of some food starches, modified food starches. Non starch polysaccharides: Cellulose, hemicelluloses, pectin, gum, animal polysaccharides. Cereals and cereals products: Cereals grains: Structure and composition, Flours and flour quality, Extruded foods, breakfast cereals, wheat germ, bulger, puffed and flaked cereals	10 hours
3.	Fats, oils and related products: Sources, Composition, effect of composition on fat properties. Functional properties of fat and uses in food preparation. Fat substitutes, fat deterioration (Rancidity) and antioxidants. Sugars and sweeteners: Sugars, syrups, potent sweeteners, sugar product. Sweetener chemistry related to usage in food products: Structural relationships to sweetness perception, hydrolytic reactions, solubility and crystallization, hygroscopicity, fermentation, non-enzymatic browning.	10 hours
4.	Dairy products: Milk Composition, physical and functional properties. Denaturation effects of processing and storage. Milk products: Cultured milk, yogurt, butter, whey, cheese, concentrated and dried products, frozen desserts, dairy product substitutes. Enzymes: Nature of enzymes, stability and action. Proteolytic enzymes, oxidase, lipases, enzymes decomposing carbohydrates, immobilized enzymes Protein denaturation, non-enzymatic browning	10 hours

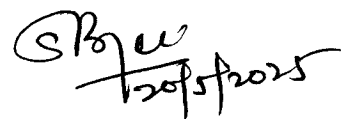
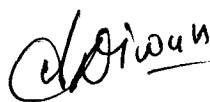
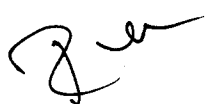
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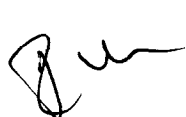
1. "Food Chemistry" by Owen R. Fennema. (1996). CRC Press.
2. "On Food and Cooking: The Science and Lore of the Kitchen" by Harold McGee. (2004). Scribner.
3. "Food Science" by Norman N. Potter and Joseph H. Hotchkiss. (1998). Springer.
4. "Modern Food Microbiology" by James M. Jay, Martin J. Loessner, and David A. Golden. (2005). Springer.
5. "Food Processing Technology: Principles and Practice" by P.J. Fellows. (2009). Woodhead Publishing.



CONTENT OF THE COURSE SEMESTER II PAPER VII- FOOD CHRMISTRY COURSE CODE MSCFN 230		
Unit	Subject	Hours
1.	Meat and Poultry: Muscle composition, characteristics and structure. Post mortem changes during processing, preservation and their effects. Heat induced changes in meat variables in meat preparation, Tenderizing treatments, meat products. Eggs: Structure and composition, changes during storage. Functional properties of eggs, use in cookery. Egg processing, low cholesterol egg substitutes.	10 hours
2.	Fish and sea foods: Types and composition, storage and changes during storage, changes during processing, by- product and newer products. Pulses and Legumes: Structure, composition, processing, toxic constituents. Nuts and oil seeds: Composition, oil extraction and by-products.	10 hours
3.	Fruits and vegetables: Plant, anatomy, gross composition, structure, features and activities of living systems. Enzymes in fruits and vegetables. Flavour constituents, plant phenolics, pigments, postharvest changes. Texture of fruits and vegetables. Effects of storage, processing and preservation. Spices and condiments: Composition, flavouring extracts-Natural and synthetic. Beverages: Synthetic and natural, alcoholic and non-alcoholic, carbonated and non- carbonated, coffee, tea, cocoa, malted drinks.	10 hours
4.	Traditional processed products: jam, jellies & squash. Protein concentrates: Hydrolysates and textured vegetable proteins, milk substitutes. Fermented food-cereal based, pulse based, fruit/vegetables based like vinegar, pickle and alcoholic beverages. Leavened products: Leavened agents biologically leavened and chemically leavened products. Batters and dough, bakery products. Salt and salt substitutes	10 hours

References

1. Charley, H. (1982) Food Science (2nd edition), John Wiley and Sons, New York.
2. Potter, N. and Hotchkiss, J.H. (1996) Food Science, Fifth edition, CBS Publishers and Distributors, New Delhi.
3. Belitz, H.D. and Grosch, W. (1999) Food Chemistry (2nd edition), Springer, New York.
4. Abers, RI, (Ed) (1976) Foam, Academic Press, New York.





CONTENT OF THE COURSE
SEMESTER II

PAPER VIII- THERAPEUTIC NUTRITION

COURSE CODE MSCFN 240

Unit	Subject	Hours
1.	Etiology, metabolism and clinical manifestation.: Complication Prevention and recent advances in nutritional management of GIT Disorders. Gastritis- Types, dietary modification. Peptic ulcer, etiology, symptoms, dietary modification, Intervals of feeding, bland diet, four stage diet Therapy, prevention of recurrence. Diarrhea – Classification, dietary consideration. Constipation, classification, dietary consideration. Ulcerative colitis symptom, dietary treatment. Sprue types, dietary consideration	10 hours
2.	Diseases of liver and gall bladder- Jaundice – classification and dietary treatment. Hepatitis – types and dietary management. Hepatic coma – causes and dietary management. Cirrhosis- Type and dietary management. Cholecystitis- Types and dietary management. Cholelithiasis- aetiology and dietary management. Pancreatic disorders: aetiology, pathogenesis and nutritional care.	10 hours
3.	Renal diseases- Basal renal functions, classification of renal disease. Glomerulonephritis- Acute and chronic- symptoms and dietetic treatment. Nephrosis symptoms and principles of nutritional care. Renal failure- Acute and chronic renal failure, dialysis. Renal calculi- aetiology, types of stones and nutritional care acid and alkaline ash diet. Fevers and infections-Types of fever, Tuberculosis, typhoid and malaria dietetic management. Cardiovascular diseases: Classification. Hyperlipidaemia- Classification and nutritional care. Atherosclerosis – Etiological factors, pathogenesis dietetic management. Hypertension – Classification, aetiology, nutritional care.	10 hours
4.	Weight Imbalance: Regulation of energy in take Obesity – Types, aetiology, treatment, diet and other measures, complication of obesity. Underweight ness – causes, dietetics management. Historical background, prevalence, aetiology biochemical and clinical manifestation, preventive and therapeutic measures for metabolic disorders. Diabetes Mellitus- Incidence and predisposing factors, Symptoms, types and diagnoses, metabolism in diabetes, dietary management and meal management Hypoglycaemic agents and insulin, complications of diabetes Disorders of thyroid gland: normal thyroid function	10 hours

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	Hyperthyroidism - symptoms and treatment	
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References

- Avantina Sharma, Principles of Therapeutic Nutrition and Dietetics First Edition, Kindle Edition
- Sumati R. Mudambi, Fundamentals Of Foods, Nutrition and Diet Therapy
- Indrani TK, Manual of Nutrition & Therapeutic Diet
- Dr. Suryatapa Das, Textbook of Therapeutic Nutrition
- Shubhangini A Joshi, Nutrition and Dietetics |5th Edition 2021

PRACTICAL- II

FOOD SCIENCE AND THERAPEUTIC NUTRITION

Max. Marks: 100

DISTRIBUTION OF MARKS

Sessional	- 20
Viva	-20
Practical	- 60 (Exercise two of 30 each)

Part-A

1. Collection and storage of biological samples for clinical investigation.
2. Market survey of commercial nutritional supplements and nutritional support substrates.
3. Commonly used test for diagnosis of various - system — wise Interpretation of patient data and diagnostic tests and drawing up of patient diet prescription, using a case study approach.
4. Follow up- acceptability of diet prescription, compliance, discharge diet plan.
5. Preparation of diet counseling aids for common disorders.
6. Planning and preparation of diets for patients with common multiple disorders and complications and discharge diet plans.

PART-B

1. Effect of solutes on boiling point and freezing point of water.
2. Effect of types of water on characteristic of cooked vegetables, Pulses and cereals.
3. **Sugar and Jaggery Cookery:** Relative sweetness, solubility and sizes of sugars, stages. of sugar cookery, caramelization, crystallization, factors affecting crystal formation

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4. **Starches Vegetables Gums and Cereals:** Dextrinization, gelatinization, retro gradation, thickening power, Factors affecting gels. Gluten formation and factors affecting gluten formation.
5. **Jams and Jellies:** Pectin content of fruits, role of acid pectin and sugar in jam and jelly formation, Use of gums as emulsifiers / stabilizers.
6. **Fat and Oils:** Flash point, melting point and smoking point, Role of fast and oils in cookery as: Shortening agent, frying medium, Factors affecting fat absorption. Fat crystals. Plasticity of fats Permanent and semi- permanent emulsions.
7. **Milk & Milk Products:** Scalding denaturation ration. Effect of acid, salt, alkali, sugar, heat) enzymes, polyphenols on milk Khoa, curd, paneer. Cheese (ripened and unripened).
8. **Egg:** structure assessing egg in quality. Use of egg in cookery: Emulsions air incorporation, thickening, binding, and gelling. Method of egg cookery and effect of heat white foams and factors affecting foams:
9. **Pulses:** Effect of various cooking and processing methods on various functional properties of pulses and their products.
10. **Gelatin:** Gelatin gel strength and factors affecting gelatin.
11. **Fruits and Vegetables:** Pigments: Effects of cooking metal ions, ph, effect of various cooking processes on different characteristics of vegetables. Prevention of enzymatic browning.
12. **Leavened Products:** Fermentation- Use of microorganisms ((lactic acid yeast). Steam as an agent, Egg as a chemical agent.
13. **Frozen Desserts:** Factors affecting ice crystal formation. Quality characteristics of frozen Dessert

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FOOD SCIENCE AND NUTRITION
M.Sc.- III SEMESTER
PART- I THEORY
PART II-PRACTICAL
COURSE OUT COME

MSc. FOOD SCIENCE AND NUTRITION

SEMESTER III

MSc (HSc.) FSc. & N SEM III	Paper IX	Advanced Nutrition	Basic Principles of Diet Planning Nutritional Requirements and RDAs Nutrient Roles and Function Digestion and Metabolism Impact of Nutrition on Health
	Paper X	Nutritional Biochemistry	Describing the elements of nutrients Understanding the role of nutrients in key biochemical pathways Analysing the chemical composition of foods
	Paper XI	Nutrition for Health of Women and Children (Elective)	Understanding Nutritional Needs: Identifying Health Problems: Applying Nutrition Therapy:
	Paper XI	Fundamentals of Food and Nutrition Science (Elective)	Understanding Basic Nutrition Principles Macronutrients, Micronutrients Energy Balance, Nutritional Needs Food and Disease Food Safety and Quality Dietary Guidance
	Paper XII	Methods of Investigation	Develop a foundational understanding of research concepts, methodologies, and ethical considerations. Distinguish between various research methods, including qualitative and quantitative approaches, and understand their application. Identify and analyse the complexities of research problem selection and research design.
		Practical	Nutritional Biochemistry






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CONTENT OF THE COURSE
SEMESTER III

PAPER IX - ADVANCED NUTRITION

COURSE CODE MSCFN 310

Unit	Subject	Hours
1.	Energy: Energy content of foods. Physiological fuel value- review. Measurement of Energy Expenditure: BMR, RMR thermic effect of feeding and physical activity, methods of measurement of basal metabolism. Estimating energy requirements of individuals. Regulation of energy metabolism: control of food intake, digestion, absorption and body weight. Water: Regulation of intra and extra cellular volume-Osmolality, water balance and its regulation.	10 hours
2.	Carbohydrates: Types, classification, digestion and transport- review, dietary fibre, fructo, oligosaccharides, resistant starch- chemical composition and physiological effects Glycemic index of foods. Sweeteners nutritive and non nutritive. Proteins: Classification, digestion, absorption and transport review. Metabolism of proteins: Role of muscle, liver and gastro intestinal tract. in protein metabolism. Protein quality, methods of evaluating protein quality. Protein and amino acid requirements. Therapeutic applications of specific amino acid.	10 hours
3.	Lipids: Classification digestion, absorption, transport- review – Functions of fat E.F.A. Role of n-3 n-6 fatty acids in health and disease. Requirements of total fat and fatty acids. Trans fatty acids, prostaglandins, phospholipids, cholesterol. Minerals: Macro minerals: calcium, phosphorus, magnesium, sodium, potassium and chloride. Micro minerals: Iron, copper, zinc, manganese, iodine, fluoride. Trace minerals: Selenium cobalt, chromium, Cadmium, silicon, boron, nickel.	10 hours

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4.	Vitamins: Historical background, structure, food sources, absorption and transport metabolism biochemical function, and assessment of status. Interactions with other nutrients. Physiological, pharmacological and therapeutic effects, toxicity and deficiency with respect to the following. Fat soluble Vitamins A, D, E, & K Water Soluble: thiamine riboflavin, niacin, biotin, pyridoxine, folic acid, pantothenic acid, ascorbic acid, cyanocobalamin, choline, inositol, ascorbic acid.	10 Ours
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References

- Scrimshaw, N.S. and Gleason, G.R. (1992) Assessment Procedures. Qualitative Methodologies for Planning and Evaluation of Health related Programmes. International Nutrition foundation for Developing Countries, Boston.
- Van Maanen (1983) Quantitative Methodology, Sage Publication.
- Cook, T.D. and Richard, C.S. (1979): Qualitative Methods in Evaluation Research, Sage Publications, and London.
- Hunter, J.E. and Shmidt (1990): Methods of Meta- analysis- Correcting Error and Blas in Research Findings, sage Publications London.
- Walker, R. (1983): applied Qualitative Research, gower, London.

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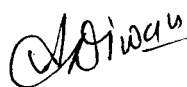
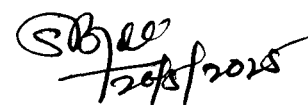
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CONTENT OF THE COURSE SEMESTER III		
PAPER X- NUTRITIONAL BIOCHEMISTRY		COURSE CODE MSCFN 320
Unit	Subject	Hours
1.	Hetero polysaccharides- Definition, classification, structure and properties of glycoprotein, and proteoglycans. Inter mediatory metabolism- Reactions, standard for energy changes and regulating. Carbohydrates- glycolysis, gluconeogenesis, citric acid cycle, hexose-mono-phosphate pathway. Lipids- Beta oxidation synthesis of fatty acids. Synthesis and breakdown of unsaturated fatty acids, cholesterol, phospholipids. And triacylglycerol.	10 hours
2.	Purines and pyrimidines- Synthesis and break down source of various atoms of the purine base. salvage reaction, Biosynthesis of purines and pyrimidines. Plasma proteins- Nature Properties and functions. Nucleic acids- DNA replication and transcription method of replication fork, okazaki segment, rule of sigma factor and core enzyme. DNA recombinant-Bio medical importance, restriction enzyme cloning, libraries & libraries construction.	10 hours
3.	Protein bio synthesis, initiation, formation of UOS, complex formation of complex, elongation. Hormones- characteristic, classification, mechanism of action and functions of Hormones, Thyroxine, TSH, LH, ACTH and insulin. Minerals- trace elements, their physiological function sources, absorption, excretions & deficiency of iron, copper, iodine zinc and selenium	10 hours
4.	Detoxification in the body- Metabolism of foreign compounds oxidation conjugation, reduction hydrolyses. Major alteration in CHO protein and fat metabolism in chronic nutrition, related generative diseases diabetes, heart diseases.	10 hours

References

1. Deb, T.C. – Principles of Biochemistry.
2. Harper – Physiological Biochemistry.
3. West and Todd – Text Book of Biochemistry.
4. Lubert / Stryer – Text Book of Biochemistry.

CONTENT OF THE COURSE SEMESTER III PAPER XI - NUTRITION FOR HEALTH OF WOMEN AND CHILDREN (Elective) COURSE CODE MSCFN 330 A		
Unit	Subject	Hours
1.	Role of women in national development. Women in family and community: Demographic changes menarche, marriage, fertility, morbidity, mortality, life expectancy, sex ratio, aging, widowhood. Women in society: Women's role, their resources, and contribution to family, and effect of nutritional status. Women and health: Health facilities. Disease pattern and reproductive health	10 hours
2.	Policies and programs for promoting maternal and child nutrition and health. Concept of small family. Methods of family planning-Merits and demerits. Importance of nutrition prior to and during pregnancy- Prerequisites for successful outcome. Effect of under nutrition on mother and child including pregnancy outcome and maternal and child health- Short term and long term effect.	10 hours
3.	Physiology and endocrinology of pregnancy, embryonic and foetal growth and development. Nutritional requirements during pregnancy: Adolescent pregnancy, pregnancy and T.B., TUGR, gestational diabetes. Lactation- Development of mammary tissue and role of hormones- Physiology and endocrinology of lactation. Synthesis of milk component, let down reflex, role of hormones. Lactational amenorrhea, effect of breast feeding on maternal health. Human milk composition and factors affecting breast feeding. Human milk banking.	10 hours
4.	Management of lactation: Prenatal breast feeding, skill education. Rooming in problems – Sore nipples, engorged breast, inverted breast. Exclusive breast feeding. Infant physiology: Preterm and low birth weight infant Implication for feeding and management. Growth and development during infancy, childhood and adolescents. Feeding of infants and children and dietary management. Malnutrition- Etiology and management.	10 hours

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CONTENT OF THE COURSE SEMESTER III PAPER XI- FUNDAMENTALS OF FOOD AND NUTRITION SCIENCE (Elective) COURSE CODE MSCFN 330 B		
Unit	Subject	Hours
1	Basic terminologies related to food and nutrition, reference man, reference woman, food groups. Functions of food-physiological, psychological and social. Balanced diet, food pyramid, dietary guidelines for Indians.	10 hours
2	Energy- definition, BMR, Factors affecting BMR, energy value of foods, energy requirement, energy expenditure, measurement of energy expenditure. Classification, functions, dietary sources, RDA, clinical manifestations of deficiency and excess. Carbohydrates, lipids	10 hours
3	Classification, functions, dietary sources, RDA, clinical manifestations of deficiency and excess of – Proteins, Fat soluble vitamins, Water soluble vitamins, Minerals.	10 hours
4	Meal planning, factors affecting meal planning, concept of exchange food list, understanding specific considerations for planning meal for different groups of people. Methods of cooking: Dry, moist, frying and microwave cooking, advantages, disadvantages and the effect of various methods of cooking on foods.	10 hours
5	Food Hygiene Programs: Personal hygiene, Training programs, Infrastructure, Personal habits, Hygiene verification, Water in the food industry, Water sources, Water uses, Water quality, Treatments, Cleaning and sanitation, Cleaning agents, Sanitizing agents.	

References

- L.K. & Ecott Stump, S.(2000), Krause's Food Nutrition and Diet
- Whitney, E.N. & rolfes, S.R. (1999); Understanding Nutrition,Sizer
- Whitney, E. (2000); Nutrition Concepts & Controversies. 8th Edition
Human Nutrition – Geissler & Powers, 11th edition, Elsevier Publication

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CONTENT OF THE COURSE SEMESTER III		
PAPER XII- METHODS OF INVESTIGATION		COURSE CODE MSCFN 340
Unit	Subject	Hours
1.	-Electrolytic dissociation: Principle, technique and theory of electrolytic dissociation. -Hydrogen ion concentration: Principle and measurement of PH, indicators, buffers. -Physiochemical techniques: Principles and methodology of the following- Diffusion, Osmosis, Filtration, Surface tension, Adsorption, Centrifugation	10 hours
2.	-Chromatography: Principles, techniques and application of the following- Paper chromatography- Circular, ascending and descending. Ion exchange chromatography Column chromatography Thin layer chromatography Gas liquid chromatography High performance liquid chromatography	10 hours
3.	- Electrophoresis: Principles and techniques of paper and gel electrophoresis. - Microbiological assay: Principle and methodology of the following- Vitamins Amino acids - Colorimetry: Principles, applications.	10 hours
4.	- Radioactive isotopes: Properties, detection and uses of radioactive isotopes in medical science. - Immunological methods: Principle and technique of the following- - Radio Immuno Assay (RIA) - Enzyme Linked Immuno sorbent Assay (ELISA) -Collection of biological samples	11 Ours

References

- Hawk, P.B., Oser, B.K. and Summerson, W.H.: Practical Physiological Chemistry. Tata McGraw Hill.
- Varley, H. : Practical Clinical Biochemistry. The English language Book Society.
- Das, Debjyoti : Biophysics and Biophysical Chemistry. Academic Publisher, Calcutta.
- Okotore, R.O. : Basic separation Techniques in Biochemistry. New Age International (P) Ltd. Publishers.

PRACTICAL-III
NUTRITIONAL BIOCHEMISTRY

Max. Marks: 100

Objectives

This course will enable the students to understand the principles of biochemical methods used for analysis of food and biological samples.

Perform biological analysis with accuracy and reproducibility

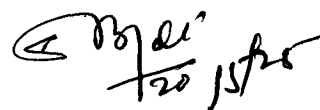
Note: Any ten practical.

PART-A

1. Calcium: Estimation of calcium in foods and serum.
2. Phosphorous: Estimation of inorganic phosphorous in foods and serum.
3. Ascorbic acid: Estimation of ascorbic acids in foods.
4. Proteins: Estimation of proteins in foods.
5. Estimation of albumin, globulin and albumin/globulin ratio in serum and urine.
6. Estimation of hemoglobin.
7. Glucose: Estimation of glucose in blood and urine.
8. Cholesterol: Estimation of cholesterol in blood.
9. Enzyme assay: Estimation of activity of serum alkaline phosphates and trans aminase.
10. Urea and creatinine: Estimation of urea and creatinine in serum and urine.
11. Survey of pathological laboratories.

PART-B

1. Acids and alkalis: Preparation of dilute solutions of common acids and alkalis and determining their exact normality.
2. Buffers; Preparation of phosphate, carbonate-bicarbonate, ascorbic acid, acetate, chloride and phthalate buffers and determination of their pH by the use of indicators and pH meters.
3. Spectrometer: Beer Lauret law, absorption maximum, preparation of standard curve and nutrient estimations in UV and visible range, AAS, AES, flame photometry.
4. Fluorimetry: Estimation of thiamin and riboflavin.
5. Chromatography: Paper - Identification of amino acid by circular, ascending and descending methods. Ion-exchange - Separation of amino acids. column Separation of proteins. Thin layer - Identification of amino acids, Gas-liquid Estimation of fatty acids, HPLC - Estimation of α -carotene and α -tocopherol.
6. Electrophoresis: Fractionation of plasma proteins.



FOOD SCIENCE AND NUTRITION
M.Sc.- IV SEMESTER
PART- I THEORY
PART II-PRACTICAL

COURSE OUT COME

MSc. FOOD SCIENCE AND NUTRITION

SEMESTER IV

MSc (HSc.) FSc. & N SEM IV	Paper XIII	Nutrition for Health and Fitness	Understand the components of health and fitness and the role of nutrition in these. Make nutritional, dietary and physical activity recommendations to achieve fitness and well- being. Develop ability to evaluate fitness and well- being.
	Paper XIV	Public Nutrition	Describing the elements of nutrients Understanding the role of nutrients in key biochemical pathways Analysing the chemical composition of foods
	Paper XV	Nutrient Deficiencies and Assessment (Elective)	Understanding Nutritional Needs: Identifying Health Problems: Applying Nutrition Therapy:
	Paper XV	Geriatric Nutrition (Elective)	Understanding Basic Nutrition Principles Macronutrients Micronutrients Energy Balance, Nutritional Needs Food and Disease Food Safety and Quality Dietary Guidance
	Paper XVI	Institution Management	Develop a foundational understanding of research concepts, methodologies, and ethical considerations. Distinguish between various research methods, including qualitative and quantitative approaches, and understand their application. Identify and analyse the complexities of research problem selection and research design.
		Practical	Nutritional Biochemistry

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CONTENT OF THE COURSE SEMESTER IV PAPER XIII - NUTRITION FOR HEALTH AND FITNESS COURSE CODE MSCFN 410		
Unit	Subject	Hours
1.	Fitness- Definitions, components and assessment criteria of age: specific fitness and health status. • Anatomical fitness • Physiological fitness • Psychological fitness Physiological fitness; Growth and development, strength, speed skill stamina, or endurance, specific fitness, general fitness, and health status. Holistic approach to the management of fitness and health: Energy input and output. Diet and Exercise, Effect of specific nutrition on work performance and physical fitness, Nutrition, exercise, physical fitness and health inter- relationship.	10 hours
2.	Review of different energy systems for endurance and power activity: Endurance - Definition, classification, and factors affecting endurance. Fuels and nutrients to support physical activity: Shifts in carbohydrate and fat metabolism mobilization of fat stores during exercise. Nutrition in Sports: Sports specific requirement. Pre-game and post- game meals. Assessment of different mutagenic acids and commercial supplements. Diets for persons with high energy requirements, stress, fracture and injury.	10 hours
3.	Water and electrolyte balance: Losses and their replenishment during exercise and sports events, effect of dehydration, sport drink. Significance of physical fitness and nutrition in the prevention and management of weight control, obesity, diabetes mellitus, CV disorders, bone health and cancer Nutrition and exercise regimes for pre and postnatal fitness.	10 hours
4.	Nutritional and exercise regimes for management of obesity. Critical review of various dietary regimes for weight and fat reduction. Prevention of weight cycling. Defining nutritional goals/ guidelines appropriate or health fitness and prevention and management of the chronic de-generative disorders Alternative systems for health and fitness like Ayurveda, Yoga, Meditation, Vegetarianism and Traditional diets.	11 ours

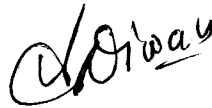
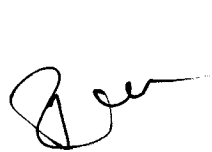
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References

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- Sizer, F & Whitney, E. (2000); Nutrition Concepts & Controversies. 8th Edition, Wadsworth, An International Thomson Publishing Co.
- Whitney, E.N. & rolfes, S.R. (1999); Understanding Nutrition, 8th Edition, West/ Wadsworth Thomson learning.
- Ira Wokinsky (Ed.) (1998): Nutrition in Exercise and sports, 3rd Edition, CRC Press. Parizkova, J. Nutrition, Physical activity and health in early life Ed. Wolinsky, I. CRC Press.
- Shils, M.E. Olson, J.A. Shike N. and Ross, A.C. (Ed.) (1999): Modern Nutrition in Health & Disease 9th Edition,
- Williams & Wilkins. McArdle, W. Katch, F and Katch, V. (1996) Exercise Physiology, Energy, Nutrion and Human Performance, 4th **Journals** Edition.
- Williams and Wikins, Philadelphia. Medicine and Science in Sports and Exercise. International Journals of Sports Nutrition.



CONTENT OF THE COURSE
SEMESTER IV

PAPER XIV - PUBLIC NUTRITION

COURSE CODE MSCFN 420

Unit	Subject	Hours
1.	Concept of Public Health Nutrition: Relationship between health and nutrition. Role of public nutritionist in the health care delivery system. Sectors and public policies relevant to nutrition. National health care delivery system.	10 hours
2.	Population Dynamics: Demography, demographic cycle, world population trend, birth rates, death rates, growth rates, demographic trends in India, age pyramid, sex ratio. Environment and Health Water: Water pollution, surveillance of drinking water quality. Air: Air pollution	10 hours
3.	Nutritional Status: Determinants of nutritional status of individual and populations. Factors affecting nutritional status. Major Nutritional Problems: Etiology, prevalence, clinical manifestations. Preventive axtherapeutic measures of - Macro and micro deficiencies - LBW, PEM, xerophthalmia, nutritional anaemia. Other nutritional problems like lathyrism, aflatoxicosis, alcoholism and fluorosis.	10 hours
4.	National Nutrition Policy Approaches and strategies for improving nutritional status and health. Occupational health Health planning and management Communication for Health Education. Health planning in India. Health Care of the Community Concept of health care, health system, levels of health care.	10 ours

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CONTENT OF THE COURSE SEMESTER IV PAPER XV - NUTRIENT DEFICIENCIES AND ASSESSMENT (ELECTIVE) COURSE CODE MSCFN 430 A		
Unit	Subject	Hours
1.	Relationship between nutrition, health and disease, Macronutrients and micronutrients –functions, food sources, Recommended Dietary Allowances according to age, sex, activity, physio- logical condition. Impact of deficiency, excess or imbalanced intake of nutrients on health.	10 hours
2.	Nutritional deficiency diseases: Protein energy malnutrition, Nutritional Anemia & Vitamin A deficiency, Iodine deficiency disorders, Vitamin D deficiency, aetiology and pathogenesis, Clinical manifestations and biochemical changes.	10 hours
3.	Public health aspects of malnutrition: Treatment of deficiency diseases- hospital and community setting. Prevention strategies- overview of National policies and Programs, Nutrition surveillance and monitoring Methods of Assessment of Nutritional Status: Types of diet surveys,	10 hours
4.	Concept of diet, quality and adequacy, Anthropometric measurements–indices and reference standards, biochemical parameters and clinical examination Food sensitivity-Types of reaction, food involve insensitivity symptoms treatment Food intolerance	10 ours

References

1. Chadha R and Mathur P (2015) Nutrition: A Lifecycle Approach. Orient Black- swan, New Delhi.
2. ICMR (2010) Nutrient Requirements and Recommended Dietary Allowances for Indians. National Institute of Nutrition, Hyderabad.
3. Maurice E Shils and Moshe Shike A (2005) Nutrition in Health and Disease. Catharine Ross and Benjamin Caballero. 10th edition. Lipincott, William and Wilkins.
4. Gibson RS (2005) Principles of Nutritional Assessment. 2nd edition. Oxford University Press.
5. Dietetics, B Srilaxmi

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CONTENT OF THE COURSE SEMESTER IV		
PAPER XV – GERIATRIC NUTRITION (Elective)		COURSE CODE MSCFN 430 B
Unit	Subject	Hours
1.	Ageing: Definition (A) Molecular changes during ageing - (i) Changes in proteins, (ii) Chromatin, (iii) Crosslinkers, (iv) Immune response, (v) Hormones, (vi) Ageing of cells in culture, (vii) Age pigment. Mechanism of Ageing - (A) Somatic mutation, (B) Errors in proteins (C) Gene regulation. Socio-psychological aspects of ageing - Especially problems of elderly women.	10 hours
2.	Nutritional and food requirement during old age - Progress of ageing, nutritional requirements, food requirements. Nutrition related problems of old age - (i) Osteoporosis, (ii) Obesity, (iii) Neurological dysfunction, (iv) Anemia, (v) Malnutrition, (vii) Constipation.	10 hours
3.	Degenerative diseases in old age - (i) Atherosclerosis, (ii) Hypertension, Cancer, (iv) Diabetes mellitus, (v) Arthritis. Common complaints during old age. Dietary guidelines Exercise, yoga, meditation in old age. Policies and programmes of the government to the elderly. Policies and programmes of the NGO sector pertaining to the elderly.	10 hours
4.	Drug - Food and nutrient reaction in elderly. (a) Effect of drugs on food intake and absorption. (b) Effect of various foods and beverages on drug action. Drug nutritional interaction. Ageing and immunity. Ageing and nutrition, nutrition and longevity, food habits of elderly people, stress during old age.	10 hours

References

1. Kumar V (1996): Ageing - Indian Perspective and Global Scenario. Proceedings of International Symposium of Gerontology and Seventh Conference of the Association of Gerontology (India).
2. Bagchi, K. and Pun, S. (Ed) (1999) Diet and Aging - Exploring Some Facets. Soc. for Gerontological Research, New Delhi and Help Age India.
3. Chaudhary, A. (Ed) (2001) Active Aging in the New Millennium, Pub. Anugraha, Delhi.

4. Shils, M.S., Olson, J.A., Shike, M. and Ross, A.C. (Ed) (1999) 9th Edition, Williams and Wilkins.
5. Sharrna, O.P. (Ed) (1999) : Geriatric Care in India - Geriatrics and Gerontology A Text book, MIs, AND Publishers.
6. Aiken, L.R. (1978) The Psychology of Later Life, Philadelphia, WB Saunders Company.
7. Bergmann, Klaus (1972) : Aged Their Understanding and Care, London, Wolfe Pub.
8. Binstock, R.H. and F. Shanes (eds) (1986) : Handbook of Aging and Social Sciences, V.N. Reinhold Co., New York.
9. Blau, Zana Smith (1983); Old Age in a Changing Society, New York Prints, New York.
10. Bose, A.B. and K.D. Gangrade (1988) : Aging in India : Problems and Potentialities, Abhinav Pub., New Delhi.
11. Desai, K.G. (1985): Problems of Retired People in Greater Bombay, TISS,
12. Ghosh, B. (1988): Contemporary Social Problems in India, Bombay, Himalaya Pub.
13. Mishra Saraswati (1987) : Social Adjustment in Old Age, Delhi, B.R. Pub.Corp.
14. Sharma, M.L. and T.M. Dak (1987) : Aging in India: Challenge for the Society, Delhi, Janta Pub.
15. Chowdhary Paul D. (1992): Aging and the aged. Inter India Pub., New Delhi.

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CONTENT OF THE COURSE SEMESTER IV		
PAPER XVI - INSTITUTION MANAGEMENT		COURSE CODE MSCFN 440
Unit	Subject	Hours
1.	Development and scope of food service History of Food Service. Food & Economics Money. Quantity Cookery: Purchase, Selection. Storage and handling of food in relation to cost and food value. Food preparation and different types of service of meals snacks. Drink etc. and their evaluation.	10 hours
2.	Meal planning or various institutions taking into account regional food habits. Comparative study of different food groups. Organization and Management of food services: Personnel Management. Selection training. Supervision labour laws. Organization of work, space, time tables and work simplification.	10 hours
3.	Food service planning: Selection of furnishings and equipment for institution kitchens and dining rooms. Sanitation and cleaning Differences in organization and management problems of hostels, annapurnas cafeteria, Hospital, School Lunch Programme with reference to foodservices.	10 hours
4.	Accounting procedure and cost control: Total budget and its distribution. Record keeping and accounting. Selling price and total incomes. Profit, loss and balance sheet.	10 ours

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PRACTICAL – IV
INSTITUTIONAL MANAGEMENT

Max. Marks: 100

Practical work at least in one institution related to the above topics.

Field trips

Management of a canteen in your institution.

OPTIONAL
PRACTICAL - IV

DISSERTATION ON CURRENT TRENDS IN FOOD AND NUTRITION

Max. Marks: 100

Dissertation: In any field of food science, nutrition and systematic writing of report along with statistical analysis of data

Current trends in food and nutrition: Acquaintance of the students with current trends in the field of food and nutrition.

Collection and compilation of latest reviews.

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