

**Maulana Abul Kalam Azad University
of Technology, West Bengal**

Department of Food Science

M. Sc. (Food Science & Nutrition) Syllabus

M. Sc in Food Science and Nutrition (SYLLABUS)

Duration: 2 Years (Four Semesters)

Level: Post Graduate Type: Degree

Intake- 30 students

Eligibility Criteria:

B.Sc. in Food and Nutrition /B.Sc. (Hons.) in Food Science/ Bachelor's Degree (with Hons.) degree in any other branch of Science and Technology related to Food and Nutrition having Hons/Minimum 140 Credit Points.

PROGRAMME OUTCOME (POs)

PO1- Disciplinary Knowledge: Acquire the knowledge of facts and figures related to pure and applied sciences. Understand the basic concepts, fundamental principles, and scientific theories related to various scientific phenomena and their relevancies in day-to-day life.

PO2- Social Skill: Communicate effectively on applied sciences activities with the science community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions by appreciating the role of science in society; and its personal, social and global importance.

PO3- Analytical Skills: Learn the skills of observations and drawing logical inferences from scientific experiments. Analyzed the given scientific data critically and systematically and had the ability to draw objective conclusions.

PO4- Critical thinking and problem solving: Recall the capacity of observation and precision. Analytical mind, logical thinking, clarity of thought and expression, systematic approach, and qualitative and quantitative decision-making are enhanced. Develop the ability to analyze and solve Course-related problems.

PO5- Research-Related Skills: Acquire the skills in handling scientific instruments, planning, and performing laboratory experiments.

PO6- Ethics, Employability, and Leadership Quality: Imbibe the ethical, moral, and social values in personal and social life leading to a highly cultured and civilized personality. Demonstrate knowledge and understanding of the management principles and apply these to

one's own work, as an entrepreneur and leader in a team, to manage projects and in multidisciplinary environments.

PO7- Life-long learning: Perceive the need for the preparation and ability to engage in independent and life-long learning in the broad perspective of scientific changes.

PROGRAM SPECIFIC OUTCOMES (PSOs)

At the end of the program, the student

PSO1: should gain in-depth theoretical and practical knowledge and apply in the field of Food Science and Nutrition for research area and higher education.

PSO2: should apply the fundamentals of Food Science, Food Microbiology, Food Chemistry, Basic Nutrition and Dietary Planning, Sensory Evaluation of Food, Food Safety Laws during food processing, food analysis, food preservation, and food packaging in the food sector after successful completion the program.

PSO3: should be able to work in the food processing and nutraceutical industries, hospitals, research organisations, and academia. In addition, the student with sound knowledge and professional skills can function as an Entrepreneur, as Dietitian or Nutritionist in order to meet the growing demand for a healthy lifestyle.

M.Sc. (Food Science & Nutrition) Syllabus.

Department of Food Science, MAKAUT, W.B

Semester –I

Course Code	Course Title	Contact Hrs./Wk	Credit
A	Theory	L-T-P	
MSUFNS-101	Food Microbiology	3-0-0	3
MSUFNS-102	Nutritional Biochemistry	4-0-0	4
MSUFNS-103	Human Physiology	3-0-0	3
MSUFNS -104	Basic Food Science & Preservation	3-0-0	3
MSUFNS-105	Analytical Techniques and Research Methodology	3-0-0	3
MSUFNS-106	English Communication Skill (non-credit compulsory course)	0-0-0	0
B	Practical		
MSUFNS-191	Food Microbiology Lab	0-0-6	4
MSUFNS-192	Biochemistry and Analytical Techniques Lab	0-0-6	4
Semester Total			24

Semester –II

Course Code	Course Title	Contact Hrs./Wk.	Credit
A	Theory	L-T-P	
MSUFNS -201	Basics of Nutrition and Health	4-0-0	4
MSUFNS -202	Nutritional Program for Public Health	4-0-0	4
MSUFNS -203	Nutraceuticals and Functional Food	4-0-0	4
MSUFNS -204	Fermented Foods and its Nutrition	2-0-0	2
MSUFNS -205	Waste Management of Food Industries	2-0-0	3
B	Practical		
MSUFNS -291	Pickles and Fermented Food Lab	0-0-6	3
MSUFNS -292	Biometric Assessment of Nutritional Status	0-0-6	4
Semester Total			24

Semester –III

Course Code	Course Title	Contact Hrs./Wk	Credit
A	Theory	L-T-P	
MSUFNS -301	Dietary Management of Diseases	5-1-0	6
MSUFNS -302	Family Meal Management & Meal Planning	4-0-0	4
MSUFNS -303	Food Processing	3-0-0	3
MSUFNS -304	Bioinformatics	3-0-0	3
B	Practical		

MSUFSN -393	Food Processing Lab	0-0-6	3
MSUFSN -394	Bioinformatics Lab	0-0-6	3
C	Elective Subject (any one)		
MSUFSN -305A	Food as Medicine and Prevention of Diseases	2-0-0	2
MSUFSN- 305B	Therapeutic Diet Preparation for Diseases	2-0-0	
Semester Total			24

Semester –IV

Course Code	Course Title	Contact Hrs./Wk L-T-P	Credit
MSUFSN-401	Entrepreneur and New venture Planning Management	2-0-0	2
MSUFSN - 402	Logistics & Supply Chain Management	2-0-0	2
MSUFSN-481	Project Work		10
MSUFSN-482	Practical Training Program & Report Presentation		2
MSUFSN-483	Journal club and Seminar Presentation in relation to Recent Food Science & Nutrition		2
MSUFSN-484	Grand Viva		6
Total			24
Total Course Credit (24+24+24+24)			96

Semester –I
MSUESN-101: Food Microbiology
(Credit-3)

Course Outcomes (COs):

CO1: Recalling of microbes and their importance, application in day to day life with special reference to food.

CO2: Illustrate various types of food contamination and spoilage by different microorganisms and their preservation techniques.

CO3: Analyze the physical as well as biochemical changes of spoiled food, food intoxication and food borne pathogens

CO4: Determine the rapid methods in detection of microorganisms along with conventional methodologies.

Theory:

Module I: Introduction and scope of food microbiology [6 Lectures]

Introduction of microbiology and its relevance to everyday life. General characteristics of bacteria, fungi, virus, protozoa, and algae. Identification of microorganisms, Morphological characteristics important in food bacteriology, Industrial importance

Module II: Growth of microorganisms [6 Lectures]

Growth curve-Intrinsic Factors (Substrate Limitations), nutrient content, pH and buffering capacity, antimicrobial barriers and constituents, water Activity, relative humidity, temperature, gaseous atmosphere

Module III: Microbiology of different foods [8 Lectures]

Cereal and cereal products, Sugar and sugar products, Vegetables and fruits, Meat and meat products, Fish, egg and poultry, Milk and milk products, Canned foods.

Environmental microbiology: Water and water borne diseases, Air and air borne diseases, Soil and soil borne diseases, Sewage and diseases.

Waste product handling: – Planning for waste disposal, Solid wastes and liquid waste, Waste treatment and disposal, Biological oxygen demand (BOD)-Preliminary treatments, Chemical treatment, Biological treatment and disposal, Types of food wastes

Microbial intoxication and infections: Sources of contamination of food, mycotoxins, toxin production and physiological action, sources of infection of food by pathogenic organisms, symptoms and method of control.

Module IV: Beneficial effect of organism & Food safety [8 Lectures]

Some applications of microorganisms-Food products: Alcoholic drinks, Dairy products, Bread, Vinegar, Pickled foods, Mushroom, Single-cell protein

Products from microorganisms: Enzymes, Amino acids, Antibiotics, Citric acid, Concepts of prebiotics, probiotics and organic food. Relevance of microbial standards for food safety. Food Agricultural Organization (FAO), World Health Organization (WHO), The International Children's Emergency Fund (UNICEF), Codex Alimentarius, The International Commission on Microbiological Specifications for Foods (ICMSF), The Food and Drug Administration (FDA), United States Department of Agriculture (USDA).

Revision: 2 Lectures

Total: 30 Lectures

Practical: MSUESN-191: Food Microbiology Lab

(Credit- 4)

Course Outcomes (COs):

CO1: Experiment with microbiological instruments used in Food Microbiology laboratory

CO2: Examine methods to isolate of microorganisms from different foods and water sample

CO3: Determine microbiological techniques to standardize quality to solve practical problems

CO4: Design appropriate SOPs for microbiological analysis of food in real-time situation

List of Experiments:

1. Microscope and its operation, Microscopic examination of bacteria, yeast and molds; Staining.
2. Media Preparation, Autoclave operation, Aseptic transfer.
3. Standard plate count; Yeast and mould count; Spore count.
4. Preparation of laboratory media and special media, cultivation of bacteria, yeasts and moulds.
5. Staining of bacteria: gram-staining.
6. Cultivation and identifications of important molds and yeast in food items.
7. Study of bacterial growth: Growth curve.
8. Evaluation of microbiological quality of commonly consumed street foods. Production of

Ethanol and vinegar by Fermentation.

Suggested Readings:

1. Frazier, W. C. and Westhoff, D. C. (1988): 4th edition, Food Microbiology, McGraw Hill Inc.
2. Jay James. N. (1986) : 3rd edition, modern Food Microbiology, Van Nestrand Reinhold Company Inc.
3. Peleazar, M.I. and Reid, K. D. (1978): Microbiology, McGraw Hill Company, New York.
4. Benson Harold, J. (1990) : Microbiological Application, McGraw Hill.
5. Colling, C.E. and Lyne, P.M. (1976): Microbiological Methods Butterworth. London.

MSUFNS-102: Nutritional Biochemistry

(Credit-4)

Course Outcome (COs):

CO1: To build the knowledge of students about biomolecules, their structures, relevant biochemical reactions and nutrition.

CO2: To develop an insight on metabolism of different biomolecules and enzymatic pathways leading to end products.

CO3: To discover the basic concepts of vitamins, hormones and water metabolism.

CO4: To create food products using the basic concepts of nutrition, different nutritional demands and dietary requirements.

Theory:

Module I: Biochemistry

[12 Lectures]

Definition, objectives, scope and interrelationship between biochemistry and other biological science. Basic process and nutritional importances of Diffusion, Osmosis, Absorption, Viscosity, Surface tension, Colloids. Principles of Thermodynamics and its importance in nutrition.

Acid, Base, Buffer, pH and Acid-Base balance. Molecular aspects of transport; Passive diffusion, facilitated diffusion, active transport.

Module II: Enzymes

[6 Lectures]

Definition, types and classification of enzymes, definition and types of coenzymes. specificity of enzymes, Isozymes, enzyme Kinetics including factors affecting enzyme action, velocity of enzyme catalyzed reactions, enzyme inhibition.

Module III: Intermediary metabolism

[12 Lectures]

- a) Carbohydrate Metabolism, Glycolysis, TCA cycle & energy generation, gluconeogenesis, glycogenesis, glycogenolysis, blood sugar regulation.
- b) Lipids : Oxidation and biosynthesis of fatty acids (saturated & mono-unsaturated) : Synthesis and utilization of ketone bodies, Ketosis, fatty livers.
- c) Proteins : General reaction of amino acid metabolism, urea cycle.
- d) Lipoproteins : Types, composition, role and significance in disease (in brief)

Module IV: Nucleic acids, Acid-Base

[6 Lectures]

Introduction to Nucleic acids: Structure, replication, transcription, genetic code (in brief) elementary knowledge of biosynthesis of proteins. Electrolytes, Introduction to acid and base. Weak acid and bases. pH.

Revision: 4 Lectures

Total: 40 Lectures

Suggested Readings:

1. Principles of biochemistry, Lehninger
2. Principles of Biochemistry, Voet
3. Bamji MS, Rao NP & Reddy V. 2003. Textbook of Human Nutrition. Oxford & IBH. Joshi SA. 1999.
4. Nutrition and Dietetics. Tata McGraw Hill. Khanna K, Gupta S, Passi SJ, Seth R & Mahna R. 1997.
5. Nutrition and Dietetics. Phoenix Publ. Swaminathan M. 1974.
6. Essentials of Foods and Nutrition. Vol. II. Ganesh & Co.
7. Osner hawk's Practical Physiological Chemistry Hawk
8. Practical Biochemistry, Thamiah

Practical: MSUFSN-192: Biochemistry and Analytical Techniques Lab

(Credit: 4)

Course Outcomes (COs):

CO1: Build the biochemical composition of food.

CO2: Analyze the different methods of separation and isolation of biochemical components of food.

CO3: Determine effective methodology to identify the common adulterants in food.

CO4: Design appropriate methods for biochemical assays in real situation.

List of Experiments:

1. Proximate analysis of content of protein and fat in foods;
2. Nitrogen value determination and calculation of calorific value of foods;
3. TSS; pH; acidity in foods and Food Products;
4. Estimation of browning intensity;
5. Determination of vitamin C and beta-carotene, sugars;
6. Estimation of calcium, phosphorus and iron; anti-nutritional factors in foods.
7. Detection of common adulterants in food:

MSUEFSN-103: Human Physiology(Credit-3)

Course Outcomes (COs):

CO1: Recall the basic knowledge of human anatomy and physiology.

CO2: Outline the different physiological systems of the body and their functions.

CO3: Identify the concept of physiological changes and analyze the importance of hormonal regulation of the body's functions.

CO4: Analyze the concept of digestion and absorption of various nutrients.

Theory:

Module-I:

[8 Lectures]

Cell structure and function. Blood cells: Haemoglobin, Blood groups, Coagulation factors, Anaemia. Respiratory System:- Ventilation, functions, Lungs volume and capacities. Skeletal System: bones, joints and bone deformities in brief. Cardiovascular System: Cardiac cycle, Cardiac output, Blood pressure, Hypertension, Radial Pulse.

Module- II:**[10 Lectures]**

Lymphatic System: Lymph glands and its function, Splen- Structure and functions.

Gastrointestinal System: Structure of various parts of the GI tract .Digestion and absorption of Carbohydrate, protein and fat.

Endocrinology: List of endocrine glands, Hormonestheir secretion and function (in brief).

Reproductive System: Structure and functions of male and female reproductive organs,

Menstrual cycle, Puberty, Menopause, fertilization and development of fertilized ovum, placenta and its function.

Module- III:**[10 Lectures]**

Excretory System: Structure of Nephron, formation of urine. Central Nervous System: Parts, Sliding filament theory, neuromuscular junction, wallerian egeneration, Motor Nervous System- Upper motor Nervous System and lower motor Nervous System. Sensory Nervous System, Sympathetic and Parasympathetic nervous system. Skin: Structure and function of skin. Special senses: Structure and function of eye and ear, common diseases in eye and ear (in brief).

Revision: 2 Lectures**Total: 30 Lectures****Suggested Readings:**

1. Ganong, W. F. (1985): Review of Medical Physiology, 12th Edition, Lange Medical Publication.
2. Moran Campell E.J., Dickinson, C.J., Slater, J.D., Edwards, C.R.W. and sikora, k.(1984): Clinical Physiology, 5th Edition, ELBS, Blackwell Scientific Publications.
3. Guyton, A.C.(1985): Function of the Human body, 4th Edition , W.B. Sanders Company, Philadephia.
4. Guyton, A.C, and Hall, J. B. (1996): Text Book of Medical Physiology, 9th Edition ,W.B. Sanders company, Prime Books (Pvt.) Ltd., Bangalore.
5. Wilson, K.J.W. and Waugh, A. (1996): Ross and Wilson Anatomy and Physiology in Health and Illness, 8th Edition, Churchill Livingstone.
6. McArdle, W.D., Katch, F.I. and Katch, V.L. (1996): Exercise Physiology. Energy, Nutrition and Human performance, 4th Edition, Williams and wilkins, Baltimore.

7. Jain, A.K., Textbook of physiology. Vol I and II. Avichal publishing co., New Delhi.

MSUFNS-104: Basic Food Science & Preservation

(Credit- 3)

Course outcomes (COs):

CO1: Outline the basic concept of structure, classification and nutritional composition of different food commodities.

CO2: Identify the selection, storage and processing technologies.

CO3: Analyze and assess the techniques of food preservation and food standard.

Theory:

Module-I

[8 Lectures]

Cereals and Millets: Cereal products, breakfast cereals, fast foods. Structure, processing, storage, use in various preparations, variety, selection and cost. Pulses and Legumes: Production (in brief), structures, selection and variety. Storage, processing and use in different preparations. Nutritional aspects and cost

Module-II

[8 Lectures]

Milk and Milk-products: Composition, classification, selection quality and cost, processing, storage and uses in different preparations. Nutritional aspects, shelf - life and spoilage. Eggs: Production, grade, quality, selection, storage and spoilage, cost, nutritional aspects and use in different preparations. Meat, Fish and Poultry: Types, selection, purchase, storage, uses, cost, spoilage of fish poultry and meat, uses and preparations.

Module-III

[10 Lectures]

Vegetables and Fruits: Types, selection, purchase, storage, availability. Cost of use and nutritional aspects of raw & processed products and use in different preparations. Sugar and Sugar products: Types of natural sweeteners, manufacture, selection, storage and use as preserver, stages in sugar cookery. Fats and Oils: Types and sources (animal and vegetable), processing, uses in different preparations, storage, cost and nutritional aspects. Raising and Leavening agents: Types, Constituents, Uses in cookery and bakery, Storage. Food Adjuncts: Spices, Condiments, Herbs, Extracts, Concentrates, Essences, Food Colours. Origin, classification, Description, uses, Specifications, procurements and Storage. Beverages : Tea; Coffee. Chocolate and Cocoa Powder-Processing, cost and nutritional aspects, other beverages- Aerated beverages, juices.

Module IV

[4 Lectures]

Food Preservation: Introduction. Principles. Basic preservation Techniques: Drying, Freezing, Refrigeration, Evaporation, Canning, Fermentation. Preserved Products: Jams, Jellies, Pickles, Squashes, Syrups types, composition and manufacture, selection, cost, storage, uses and nutritional aspects. Food Standards : ISI, Agmark, FPO, MPO, PFA.

Total: 30 Lectures

Suggested Readings:

1. Srilakshmi, B. 2005. Food Science, New Age International (P) Ltd., Publishers, New Delhi.
2. Potter, N. and Hotch Kiss, J.H. (1996): Food Science, Fifth edition, CBS Publishers and Distributors, New Delhi
3. Julians, B.O. (1985). Rice Chemistry and Technology, 2nd edition, American Association Chemists, St. Paul Mimesota, USA.
4. Charley, H. (1982). Food Science, 2nd edition, John Wiley & Sons, New York.
5. Arthey, D. and Ashurst, P.R. (1996). Fruit Processing, Blackie Academic & Professional, London
6. Desrosier, N.W. and James N. (2007). Technology of food preservation. AVI Publishers.
7. Meyer, L.H. 1974. Food Chemistry, AVI Publishing Co. Inc.

MSUFSN-105: Analytical techniques and Research methodology(Credit- 3)

Course outcomes (COs):

CO1: Recall previous and basic concepts regarding the working principle of various instruments used in food analysis.

CO2: Illustrate the advantages and reason for using various instruments in the food sector.

CO3: Identify the various knowledge of instruments to analyze different types of food matrices.

CO4: Analyze the sensitivity and reproducibility of analytical results by the various instruments.

CO5: Design and develop different methods of food analysis using various instruments.

Theory:

Module I **[5 Lectures]**

Sampling techniques; Water activity, its measurements and significance in food quality; Calibration and standardization of different instruments.

Module II **[5 Lectures]**

Spectroscopic techniques using UV/Vis, fluorescence, IR, FTIR, NIR, NMR, atomic absorption, ICP, polarimetry, refractometry, microscopic techniques in food analysis (light microscopy, SEM, TEM, XRD, particle size analysis, image analysis etc.).

Module III **[5 Lectures]**

Chromatographic techniques: Adsorption, column, partition, affinity, ion exchange, size exclusion, GC, GLC, HPLC, HPTLC, GCMS, LCMS.

Module IV **[6 Lectures]**

Separation techniques: Gel filtration, dialysis, electrophoresis, sedimentation, ultrafiltration and ultracentrifugation, solid phase extraction, supercritical fluid extraction, isoelectric focusing, isotopic techniques, manometric techniques.

Module V **[5 Lectures]**

Special techniques: Immunoassay techniques; Isotopic, non-isotopic and enzyme

immunoassays; surface tension; enzymatic methods of food analysis; thermal methods in food analysis (Differential scanning calorimetry and others).

Revisions: 4 Lectures

Total: 30 Lectures

Suggested Readings:

1. AOAC International. 2003. Official methods of analysis of AOAC International. 17th Ed. Gaithersburg, MD, USA, Association of Analytical Communities. Kirk RS & Sawyer R. 1991.
2. Pearson's Chemical Analysis of Foods. 9th Ed. Longman Scientific & Technical. Leo ML. 2004.
3. Handbook of Food Analysis. 2nd Ed. Vols. I-III. Linden G. 1996.
4. Analytical Techniques for Foods and Agricultural Products. VCH. Macleod AJ. 1973.
5. Instrumental Methods of Food Analysis. Elek Sci. Marcel Dekker. 24 Nielsen S. (Eds.). 1994.
6. Introduction to Chemical Analysis of Foods. Jones & Bartlett. Pomrenz Y & Meloan CE. 1996.
7. Food Analysis – Theory and Practice. 3rd Ed. CBS. Ranganna S. 2001.
8. Handbook of Analysis and Quality Control for Fruit and Vegetable Products. 2nd Ed. Tata-McGraw-Hill. Robinson JW. 1970. Undergraduate Instrumental Analysis. Marcel Dekker.

MSUESN-106: English communication skill (non-credit compulsory course)(Credit-0)

Course Outcomes (COs):

CO1: Recall the English skills by reading and listening comprehension, writing and speaking.

CO2: Show their vocabulary and use them effectively and appropriately.

CO3: Develop and discover the speaking skills to communicate with each other.

CO4: Assess and improve confidence in the group discussions, seminar presentations, viva-voce, job interview etc.

Theory:

Module-I: Grammar

Sentence Structure, Voice, Narration

Module-II: Writing Skills

Report Writing (Structure, Types of report), Article/ Blog writing

Module-III: Business Correspondence

Formal letter, Job Application, CV/ Resume, Email

Module-IV: Reading Comprehension (Seen & unseen)

Selected pieces from literature (1 Prose & 1 Poetry), Skill of answering questions by understanding a given text

Module-V: Communication Skills

Video & Audio Conferencing, Group Discussion, non-verbal skills, etc.

Module-VI: Speaking Skills

Mock Interview sessions, Group Discussion Practice, Extempore, Debate etc.

Suggested Readings:

1. Business Communication, by Urmila Rai & S. M. Rai. Himalaya Pub.
2. Communication Skill for Effective Management by Dr. Anjali Ghanekar. Everest Pub. House.
3. Developing Communication Skill by Krishna Mohan, Meera Banerji. McMillan

Semester –II

MSUFNS-201: Basics of nutrition and health(Credit- 4)

Course outcomes (COs):

CO1: Recall the basic concept of food, health and malnutrition.

CO2: Outline the basic food groups and daily requirement of nutrients.

CO3: Examine the structure and property of different nutrients.

CO4: Importance of digestion, absorption and function of various nutrients.

Theory:

Module-I

[6 Lectures]

Food as source of nutrients, functions of food, definition of nutrition and health, nutrients & energy, adequate, optimum & good nutrition, malnutrition. Basic five food groups How to use food guide (according to R.D.A.).

Module-II

[24 Lectures]

Nutrition and Nutrients. Classification of Food, Classification of nutrients.

Water - Functions, daily requirements

Carbohydrates - Definition, Classification, Structure and properties. Carbohydrates - Sources, daily requirements, functions. Effects of too high and too Low carbohydrates on health.

Digestion and absorption of carbohydrate.

Proteins- Definition, Classification, Structure & properties. Amino acids- Classification, types, functions. Proteins - Sources, daily requirements, functions. Effect of too high - too low protein on health. Digestion & absorption. Assessment of Protein quality (BV, PER, NPU).

Fats- Definition, Classification & Properties. Fatty acids-composition, properties, types. Lipids - sources, daily requirements, functions. Digestion & Absorption of nutrients. Role & nutritional significances of PUFA, MUFA, SFA, W-3 fatty acid.

Fibers, Minerals, and Vitamins - Dietary Fibre-Classification, sources, composition, properties & nutritional significance. Minerals & Trace Elements, Bio-Chemical and Physiological Role, bio-availability & requirements, sources, deficiency & excess. Vitamins - Bio-Chemical and Physiological Role. Module-III [6 Lectures]

Nutrition and fitness. Interrelationship between nutrition & health. Use of carbohydrate, protein and fat, minerals and vitamins from food sources and its significances. Role of dietary fibres in human nutrition. Effect of cooking on the nutritive value and Food sanitation in hygiene.

Revision: 4 Lectures

Total: 40 Lectures

Suggested readings:

1. Srilakshmi, B. 2005. Food Science, New Age International (P) Ltd., Publishers, New Delhi.
2. Potter, N. and Hotch Kiss, J.H. (1996): Food Science, Fifth edition, CBS Publishers and Distributors, New Delhi
3. Julians, B.O. (1985). Rice Chemistry and Technology, 2nd edition, American Association Chemists, St. Paul Mimesota, USA.
4. Charley, H. (1982). Food Science, 2nd edition, John Wiley & Sons, New York. 5. Srilakshmi(2008). Nutrition Science. New Age International Pvt. Ltd, New Delhi.
6. Mahan L K and Escott – Stump S (2000). Krause’s Food Nutrition and Diet Therapy 10th Ed WB Saunders Ltd
7. Shills, M.E., Olson, J., Shike, M. and Roos, C. (1998): Modern Nutrition in Health and

Disease.9th Edition .Williams and Williams. A. Beverly Co. London.

8. SreeDevi.V. (1997). Nutrition Education. Discovery Publishing House, New Delhi.

9. Bamji, M.S., Rao, P.N. and Reddy, V. (1996). Textbook of Human Nutrition, Oxford & IBHPublishing Co. Pvt. Ltd.

10. Gopalan, C. (1995). Recent Trends in Nutrition, Oxford University Press, London.

MSUFSN-202: Nutritional Programme and Public

Health(Credit-4)

Course Outcomes (COs)

CO1: Demonstrate the concept and current concerns of Public Health, Nutrition, and diseases.

CO2: Identify the plan for conducting nutrition education programs in the community.

CO3: Evaluate and develop the idea about the nutritional management during disaster.

Theory:

Module-I

[9 Lectures]

Nutritional problems of the community and implication in public health, Life style, hazards of community health and nutritional status, Nutrition policy in India and plan of action, national foodand nutrition policy plane of action and programme.

Module-II

[9 Lectures]

Population dynamics, Primary health care of the community, communicable and infectious disease control, Community water and waste management, Community food protection, Immunization schedule, Holistic approach to the management of fitness and health.

Module-III

[9 Lectures]

Nutrition and health care programmes for mother and child, nutritional requirements of the elderly people and dietary management to meet their nutritional needs, Emergencies and disaster management, disaster cycle

Module-IV

[9 Lectures]

Nutritional management of target group in disaster and emergencies Ration system in disaster and different types of nutrition rehabilitation disaster management, nutritional rehabilitation at post disaster period.

Revision: 4 Lectures

Total: 40 Lectures

Suggested readings:

1. Jelliffe, D.B. and Jelliffe, E.F.P (1989): Community Nutritional Assessment. Oxford University Press.
2. Beghin, I., Cap, M and Dujardan, B. (1988): A Guide to Nutritional Status Assessment, WHO, Geneva.
3. Gopaldas., T. and Seshadri., S. (1987): Nutritional Monitoring and Assessment. Oxford University Press.
4. Mason, J.B. Habich, J.P., Tabatabai, H. and Valverde, V. (1984): Nutritional Surveillance, WHO.
5. Lee, R.D. and Nieman, D.C. (1993): Nutritional Assessment, Brown and Benchmark Publishers.
6. Sauberlich, H.E. (Ed) (1999): Laboratory Tests for the Assessment of Nutrition Status, CRC Press.
7. Cameron, N. (1984): Measures of Human Growth. Sheridan House Inc. New York
8. Lohman, T. GL Roche, A.F.; and Martorell, R.(Ed). Anthropometric Standardization. Reference Manual. Human Kinetics Books, Illinois.

MSUFNS -203: Nutraceuticals and Functional Food

(Credit-4)

Course outcomes (COs):

CO1: Develop comprehensive understanding of different nutraceuticals and functional foods.

CO2: Assume and assess the potential of various functional foods in promoting human health.

CO3: Discuss about the manufacturing processes, regulatory challenges and market trends of nutraceuticals, functional foods and genetically modified foods.

Theory:

Module-I

[10 Lectures]

Introduction to nutraceuticals and functional foods. Basis of claim for a compound as a nutraceuticals. Regulatory aspects for nutraceuticals / functional foods including CODEX. Nutraceuticals bridging gap between food and drug. Important definitions associated with both nutraceuticals and functional foods in food industry.

Module-II**[8 Lectures]**

Role of Functional foods in health. Nutraceuticals for cardiovascular diseases, hypertension, cancer, diabetics, cholesterol management, obesity, joint pain, mood disorders, immunity enhancement.

Module-III**[8 Lectures]**

Functional properties of nutraceuticals: Lycopine, Isoflavonoids, prebiotics and probiotics, glucosamine, phytosterols, free radicals, concept of antioxidants, mushroom extracts. Adverse effect of toxicity of nutraceuticals.

Module-IV**[10 Lectures]**

Concept and metabolism of Nutraceuticals with its potential health benefit definition, Perspective for food applications for Polyphenols, Phytoestrogens, phytosterols, pigments like lycopene, carcurmin. Phytatics, Protease inhibitors, amalyasae inhibitors, Saponins, GM food-

concept, merits and demerits, Fundamental techniques for GM food preparation, Food fortification.

Revision: 4 Lectures**Total: 40 Lectures****Suggested Readings:**

1. Mary K. Schmidl, Theodore P. Labuza, 2000, Essentials Of Functional Foods
2. Se-Kwon Kim, 2013, Marine Nutraceuticals, CRC Press
3. Dilip Ghosh et al., 2012, Innovation in Healthy and Functional Foods, CRC Press
4. YashwantVishnupant Pathak, 2011, Hand book of Nutraceuticals, Volume II, CRC press
5. Robert E.C. Wildman, 2006, Handbook of Nutraceuticals & Functional Foods , Second-edition, CRC press

MSUESN -204: Fermented Foods and its Nutrition(Credit: 2)**Course outcomes (COs):**

CO1: Recall the basics on Fermentation and different fermented foods and it's nutrition.

CO2: Make use of the knowledge on Food Fermentation and related products.

CO3: Analyze and assess the quality aspects of fermented foods.

Theory:

Module-I: **[6 Lectures]**

Introduction to fermentation: microbes and food fermentations, Types of fermentation: submerged and solid state, Batch and continuous, measurement and control in fermentation, Substrate utilization and product formation. Fermentation Kinetics.

Module-II: **[6 Lectures]**

Food Fermentations; Traditional fermented foods of India and other Asian countries; Probiotics and prebiotics; Fermented foods based on milk, meat and vegetables; Microbes as food: its advantages & limitation, Baker's yeast, Mushroom, Spirulina.

Module-III: **[6 Lectures]**

Fermented beverages. Fermented food: origin, scope and development, saurkraut, yoghurt, cheese, miso, tempeh, idli, dosa. Regulatory and social aspects of biotechnology of foods, application of enzymes in food processing, production of food flavour, colour, enzymes, Immobilised enzymes.

Revision: 2 Lectures.

Total: 20 Lectures

Suggested Readings:

1. Modern Food Fermentation Technology by Wang Fu Yuan.
2. Biotechnology: Volume 1: Food Fermentation Microbiology, Biochemistry and Technology by V K Joshi.
3. Industrial Microbiology, Samuel Cate Prescott & Cecil Gordon Dunn.
4. Ethnic Fermented Foods and Alcoholic Beverages of India: Science History and Culture. ISBN: 978-981-15-1486-9. Tamang, J.P. (2020) Springer Nature, Singapore
5. Principles Fermentation Technology by, Peter, F Stanbury, Allan Whitaker, Stephen J Hall.
6. Biochemical engineering, by Shuichi Aiba, Arthur E. Humphrey & Nancy F Millis

Practical: MSUFT-291: Pickles and Fermented Food Lab

(Credit: 3)

Course outcomes (COs):

CO1: Apply and analyze the principles of food fermentation technology

CO2: Determine the quality of fermented foods

CO3: Develop various fermented food

List of Experiments:

1. Production of Baker yeast in a bioreactor.
2. Ethanol production by yeast.
3. Preparation of Sauerkraut.
4. Preparation of Idli, Dhosa.
5. Preparation of pickles.
6. Preparation of curd / yoghurt.
7. Fermentation of citric acid using sucrose and molasses

**MSUESN-205: Waste Management of Food
Industries(Credit: 3)**

Course outcomes (COs):

CO1: Interpret the characteristics and classification of wastewater generated from various food industries.

CO2: Identify the various disposal techniques of food industry waste with special attention to their economical aspects.

CO3: Examine the physical, chemical and biological waste treatment and in plant sanitation.

CO4: Choose the treatment methodologies of solid wastes generated from food industry.

CO5: Discuss the recovery of useful materials from effluents by different methods and environmental legislations to discharge the waste into the environment.

Theory:

Module-I:

[8 Lectures]

Introduction: Classification and characterization of food industrial wastes from Fruit and Vegetable processing industry, Beverage industry; Fish, Meat & Poultry industry, Sugar industry and Dairy industry; Waste disposal methods – Physical, Chemical & Biological; Economical aspects of waste treatment and disposal.

Module-II:

[6 Lectures]

Treatment methods for liquid wastes from food process industries; Design of Activated Sludge Process, Rotating Biological Contactors, Trickling Filters, UASB, Biogas Plant.

Module-III:

[6 Lectures]

Treatment methods of solid wastes: Biological composting, drying and incineration; Design of Solid Waste Management System: Landfill Digester, Vermicomposting Pit.

Module-IV:**[6 Lectures]**

Biofilters and Bioclarifiers, Ion exchange treatment of waste water, Drinking-Water treatment, Recovery of useful materials from effluents by different methods.

Revision: 4 Lectures**Total: 30 Lectures****Suggested Readings:**

1. Food Industry Wastes: Disposal and Recovery; Herzka A & Booth RG; 1981, Applied SciencePub Ltd.
2. Water & Wastewater Engineering; Fair GM, Geyer JC & Okun DA; 1986, John Wiley & Sons, Inc.
3. Wastewater Treatment; Bartlett RE; Applied Science Pub Ltd.
4. Symposium: Processing Agricultural & Municipal Wastes; Inglett GE; 1973, AVI.
5. Food Processing Waste Management; Green JH & Kramer A; 1979, AVI.
6. Environmental Biotechnology: Principles and Applications; Rittmann BE & McCarty PL; 2001, Mc-Grow-Hill International editions.
7. Environmental Biotechnology; Bhattacharyya B C & Banerjee R; Oxford University Press.

Practical: MSUFSN-292: Biometric assessment of Nutritional Status(Credit- 4)

Course outcomes (COs):

CO1: To recall study on the nutritional status and programme.

CO2: Experiment with the anthropometric/biometric parameters by instrument.

CO3: Make use of anthropometric/biometric and nutritional status operating instruments.

List of Experiments:

1. Determination of socioeconomic status
2. W/H ratio, BMR, Body fat assessment in different zone
3. Determination of energy requirement of light, moderate and heavy workers
4. Determination of nutritional consumption by questionnaire method
5. Determination of nutritional status by weighing method/ cooked food method
6. Study on nutritional status of the beneficiaries under National nutritional Programme

Semester –III

MSUFSN-301: Dietary management of diseases

Credit: 6 (5 +1)

Course outcomes (COs):

CO1: Define various diseases.

CO2: Outline the causes, symptoms, epidemiology and management of various diseases.

CO3: Identify the mechanism of diseases.

CO4: Apply, analyze and assess the dietary modification according to health and nutritional status.

Theory:

Module-I

[6 Lectures]

Non communicable disease-Diabetes (Type -I and Type- II)-Epidemiology, pathophysiology, causes & dietary management Hypertension –Epidemiology, pathophysiology causes & dietary management.

Module-II

[10 Lectures]

Hyperlipidemia-Epidemiology, pathophysiology causes & dietary management Atherosclerosis-Epidemiology, pathophysiology causes & dietary management Nutritional anaemia-Epidemiology, pathophysiology causes & dietary management Cancer-Epidemiology, pathophysiology causes & dietary management Constipation-Epidemiology, pathophysiology causes & dietary management

Module-III

[4 Lectures]

Food allergy-Epidemiology, pathophysiology causes & dietary management.

Module-IV

[20 Lectures]

Gastro Intestinal Diseases: Cholera-Epidemiology, Pathophysiology, Cause and dietary management Diarrhoea-Epidemiology, Pathophysiology, Cause and dietary management Dysentery-Epidemiology, Pathophysiology, Cause and dietary management Flatulence-Epidemiology, Pathophysiology, Cause and dietary management GERD- Epidemiology, Pathophysiology, Cause and dietary management Junundice-Epidemiology, Pathophysiology, Cause and dietary management Hepatitis-Epidemiology, Pathophysiology, Cause and dietary

management Ulcer- Epidemiology, Pathophysiology, Cause & dietary management. Irritable Bowel Syndrome-Epidemiology, Pathophysiology, Cause & dietary Management Colitis-Epidemiology, Pathophysiology, Cause & dietary management.

Module-V

[14 Lectures]

Rheumatic diseases-Epidemiology, Pathophysiology, Cause & dietary management. *Osteoarthritis* -Epidemiology, Pathophysiology, Cause & dietary management. *Lupus arthritomatosis*-Epidemiology, Pathophysiology, Cause & dietary management.

Revision: 6 Lectures

Total: 60 Lectures

Suggested Readings:

1. Disease and Diet: Vol. I & II, Swapan Banerjee.
2. Food and Nutrients in disease Management: Ingrid Kohlstadt.
3. Nutrition in the prevention and treatment of diseases: 4th Edition, Ann Coulston.
4. Nutrition Management of inherited metabolic diseases: Bernstein, Laurie E., Rohr, Fran, Helm, Joanna R.
5. Nutrition in the prevention and treatment of disease: Coulson, Rock, Monsen.
6. Handbook of Nutrition and Diet: B.B. Desai.

MSUFSN-302: Family meal management and meal planning(Credit- 4)

Course outcomes (COs):

CO1: Define the principle and need of meal planning.

CO2: Illustrate and identify the physiology and nutritional problems of various phases of life.

CO3: Analyze and assess the role of nutrition.

CO4: Design and develop the meal planning according to individuals needs

Theory:

Module-I

[10 Lectures]

Nutrition during Pregnancy: Physiology of pregnancy, factors (nonnutritional) affecting pregnancy outcome, importance of adequate weight gain during pregnancy, antenatal care and its schedule, Nutritional requirements during pregnancy and modification of existing diet and supplementation, nutritional factors affecting breast feeding. Deficiency of nutrients and impact- energy, iron, folic acid, protein, calcium, iodine. Common problems of pregnancy and their managements- nausea, vomiting, pica, food aversions, pregnancy induced hypertension, obesity, diabetes and Adolescent Pregnancy.

Module-II

[10 Lectures]

Nutrition during Lactation: Physiology of Lactation: Nutritional requirements during lactation, dietary management, food supplements, galactogogues, preparation for lactation. Care and preparation of nipples during breast feeding. Nutrition during infancy: Infant physiology relevant to feeding and care. Breast feeding - colostrums, its composition and importance in feeding. Initiation of breast-feeding and duration of breast- feeding, Advantages of exclusive breast-feeding, Nutritional and other advantages of breast-feeding. Introduction of complementary foods, initiation of management of weaning, breast feeding etc. Bottlefeeding circumstances under which bottle-feeding is to be given. Care and sterilization of bottles. Preparation of formula. Mixed feeding, breast feeding and artificial feeding. Teething and management of problems.

Module-III

[10 Lectures]

Nutrition to toddlers / preschool/school going children or adolescent. Management of preterm and low birth weight children – their special needs. Growth and development from infancy to adulthood: Importance of nutrition for ensuring adequate development, Preventions of growth faltering. Growth assessment by Height, Weight, BMI, Skin fold thickness, Waist Hip Ratio. Geriatric nutrition – Dietary requirement, Geriatric health problems, Nutritional care. Sports Nutrition- nutritional demand on different sports and dietary recommendations. Space Nutrition- Body composition changes in space, special diet in space persons.

Module-IV

[8 Lectures]

Meal planning for the family Indian meal pattern- vegetarian and non- vegetarian. Food faddism

and the faulty food habits. Nutritive value of common Indian recepies.

Revision: 2 Lectures

Total: 40 Lectures

Suggested Readings:

1. Scrimshaw, N. and Gleason G (Ed) (1991): Rapid Assessment Methodologies for Planning and Evaluaton of Health Related Programs. Published by (INFDC) Internationa; Nutrition Foundation for Developing Countries.
2. FAO Nutritional Studies No. 4 (1953): Dietary Surveys: Their Technique and Interpretation,FAO.
3. Bingham, Sa.A. (1987): The Dietary Assessment of Individuals, Methods. Accuracy, New Techniques and Recommendations Nutrition Abstracts and Reviews. 57: 705-743.
4. 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.
5. Ulijaszek, S.J. and Mascie-Taylor, C.G.N. (Ed) Anthropometry: the Individual and the Population, Cambridge University Press, Cambridge.
6. Shetty, P.S. and James, W.P.T. (1994): Body Mass Index. A Measure of Chronic Energy deficiency in Adults. FAO Food and Agriculture Organization of the United Natins, Rome.
7. Davies, P.S.W. and Cole, T.J. (Ed): Body Composition Techniques in Health and Diseas.Cambridge University Cambridge.
8. Himes, J.H.(1991): Anthropometric Assessment of Nutritional Status. Wiley-Liss New York.

MSUEFSN-303: Food Processing(Credit-3)

Course outcomes (COs):

- CO1:** Relate the basic knowledge of food science to understand the need and importance of food processing.
- CO2:** Determine the principle, working mechanism, advantages and disadvantages of different methods and techniques of food processing.
- CO3:** Assess the appropriate application of different types of processes in specific foods

ensuring maximum retention of nutritional and organoleptic quality of food products.

Theory:

Module-I **[6 Lectures]**

Scope of food processing; historical developments; principles of food processing and preservation.

Module-II **[10 Lectures]**

Processing by heat – blanching, pasteurization, sterilization and UHT processing, extrusion cooking, dielectric heating, microwave heating, baking, roasting and frying, etc. CA, MA storage. Ultra- filtration, Reverse Osmosis.

Module-III **[6 Lectures]**

Processing and preservation by non-thermal methods, irradiation, high pressure, pulsed electric field, hurdle technology.

Module-IV **[4 Lectures]**

Pickling, smoking; Food additives: some applications.

Revision: 4 Lectures

Total: 30 Lectures

Suggested Readings:

1. Arsdel WB, Copley MJ & Morgan AI. 1973. Food Dehydration. 2nd Ed. Vols.I, II.AVI Publ. Desrosier NW & James N.1977.
2. Technology of Food Preservation. 4th Ed. AVI.Publ. Fellows PJ. 2005.
3. Food Processing Technology: Principle and Practice. 2nd Ed. CRC.Jelen P. 1985.Introduction to Food Processing.Prentice Hall. Potter NN & Hotchkiss 1997. Food Science.5th Ed. CBS.Potty VH &Mulky MJ. 1993.
4. Food Processing. Oxford & IBH.
5. Ramaswamy H &Marcotte M. 2006. Food Processing: Principles and Applications. Taylor & Francis.

MSUFSN -393: Food Processing

Lab(Credit-3)

Course outcomes (COs):

CO1: Construct different methods applied to processing of foods and preservation.

CO2: Construct process flow diagrams and compare various process technologies.

CO3: Analyze the changes of raw food materials during postharvest storage and transformation into food products and classify them

CO4: Develop innovative methods for process and preservation technologies.

List of Experiments:

1. Dehydration of Foods
2. Freezing of Foods
3. Preparation of Mango pickles.
4. Preparation of Squash
5. Preparation of Jam
6. Preparation of Jelly
7. Preparation of Bread.

MSUESN -304: Bioinformatics
(Credit-3)

Course outcomes (COs):

CO1: Explanation of various biological databases of specific interest.

CO2: Identify the whole genome analysis.

CO3: Analyzing and assessing the protein sequencing and their characterization.

Theory:

Module-I

[10 Lectures]

Introduction: Introduction to genomic research and data generation. Requirement of bioinformatics in Food Science and Nutrition. Information resources: NCBI, EBI, Primary Sequence and Structure Database: Genbank, EMBL, PIR, PDB, KEGG, Derived (Secondary) Databases of sequences and structures: Prosite, Pfam.

Module-II

[10 Lectures]

Sequence file formats: fasta, genbank, embl, Swiss-port, pnb, nbrf, pir and multiple sequences formats (Aln, Mega, Pileup, phylip). Sequence Similarity Basics: Similarity, Identity, Homology, Scoring, Selectivity/Sensitivity, Gap cost, Linear and Affine gap Penalty, Basics of scoring system and matrices (PAM, BIOSUM, GONNET, Clustal W, Clustal X).

Module-III

[10 Lectures]

Nucleic acid and Protein Data Bases, Nutrient data bases. Sequence similarity searching by BLAST, Principle, features and types of BLAST, Significance of Multiple Sequence Alignments, Phylogenetic Tree.

Total: 30 Lectures

Suggested Readings:

1. Saxena Sanjay (2003) A First Course in Computers, Vikas Publishing House.
2. Pradeep and Sinha Preeti (2007) Foundations of Computing, 4th ed., BPB Publications.
3. Lesk M.A. (2008) Introduction to Bioinformatics. Oxford Publication, 3rd International Student Edition.
4. Rastogi S.C., Mendiratta N. and Rastogi P. (2007) Bioinformatics: methods and applications,genomics, proteomics and drug discovery, 2nd ed. Prentice Hall India Publication.
5. Primrose and Twyman (2003) Principles of Genome Analysis & Genomics. Blackwell.

MSUFSN -394: Bioinformatics**Lab(Credit-3)****Course Outcomes (COs)**

CO1: Make use of different software for protein sequencing.

CO2: Discover the Protein sequencing and multiple alignment of protein sequence using sophisticated software.

CO3: Design of protein structure using PDB.

List of Experiments:

1. Give five nucleotide and five protein sequences in FASTA format from NCBI and EMBL.
2. Visualize tertiary structure of any given protein sequence.
3. Search the protein sequence of the species using PIR and Swissprot/Uniprot.
4. Carry out the multiple sequence alignment of the proteins with Clustal OMEGA.
5. Perform the pair wise alignment of the given proteins using Dotplot/EMBOSS water /EMBOSS needle.
6. Find the structure of protein using PDB.

MSUFSN -305A: Food as Medicine and Prevention of**Diseases(Credit- 2)****Course outcomes (COs):**

CO1: Define the concept of disease and medicine.

CO2: Demonstrate food habits and related hazards.

CO3: Build, analyze and assess the knowledge of food for common diseases.

Theory:

Module-I

[6 Lectures]

Concept of disease- communicable and non-communicable disease, life style disorder. Verybasic concept of medicine. Culture of health and wellness and healthy food.

Module-II

[10 Lectures]

Supplementary and fortified food. Fast food and junk food culture and its related hazards.Practice of healthy food habit frominfancy, Food for common disorders-fever, gastritis, diarrhea, IBS, colitis. Food for lifestyle disorder-stress and anxiety, obesity, diabetes, hypertension andcardiovascular disorders, renal disorders, asthma, COPD.

Revision: 4 Lectures

Total: 20 Lectures

Suggested Readings:

1. Dietetics: BY-- B. Srilaksmi.
2. Cilnical Dietetics and Nutrition: BY-- Antia.
3. Clinical Nutrition: BY-- Mary Width, and Tonia Reinhard.
4. Nutrition and Dietetics: Shubhangini A. Joshi

MSUFSN -305B: Therapeutic diet chart preparation for diseases(Credit- 2)

Course outcomes (COs):

CO1: Recall different types of food stuffs and groups.

CO2: Develop team approach to health care.

CO3: Examine different diets for disease conditions.

CO4: Design routine hospital diets.

Theory:

Module-I

[6 Lectures]

Therapeutic diet charts for current social diseases - Therapeutic diet chart preparation for Diabetes, case specific Therapeutic diet chart preparation for Hypertension, case specific Therapeutic diet chart preparation for Hyperlipidemia case specific Therapeutic diet chart preparation for Atherosclerosis, case specific Therapeutic diet chart preparation for Nutritional anemia, case specific Therapeutic diet chart preparation for Cancer, case specific Therapeutic diet chart preparation for Constipation, case specific Therapeutic diet chart preparation for Food allergy, case specific

Module-II

[10 Lectures]

Therapeutic diet chart for Gastro Intestinal Diseases- Therapeutic diet chart preparation for Cholera, case specific Therapeutic diet chart preparation for Diarrhoea, case specific Therapeutic diet chart preparation for Dysentery, case specific Therapeutic diet chart preparation for Flatulence, case specific Therapeutic diet chart preparation for Jaundice, case specific Therapeutic diet chart preparation for Hepatitis, case specific Therapeutic diet chart preparation for Gastritis, case specific Therapeutic diet chart preparation for Ulcer, case specific Therapeutic diet chart preparation for Irritable Bowl Syndrome, case specific Therapeutic diet chart preparation for Colitis, case specific

Module-III:

[4 Lectures]

Therapeutic diet chart for Rheumatic diseases- Therapeutic diet chart preparation for Arthritis, case specific Therapeutic diet chart preparation for Osteoarthritis, case specific Therapeutic diet chart preparation for Lupus arthritomatosis, case specific.

Total: 20 Lectures

Suggested Readings :

1. Diet planning for Diseases: M. Nisha
2. Manual of Nutrition & Therapeutic diet (2nd Edition): T.K.Indrani
3. A comprehensive Text Book of Therapeutic diets: Darshan Sohi
4. Fundamentals of Foods, Nutrition, and Diet Therapy: Mudambi and Rajagopal.

Semester –IV
MSUFNS-401: Entrepreneur and New venture Planning
Management(Credit-2)

Course outcomes (COs):

CO1: Demonstrate various forms of Entrepreneurship Models.

CO2: Make use of a Business Plan using the tools of Entrepreneurship Management.

CO3: Examine the financial calculations required to validate a Business Plan.

CO4: Importance of Government initiatives and legal processes in Entrepreneurship Management.

CO5: Design the techniques of Business Management for starting an Entrepreneurship Project in the food sector.

Theory:

Module-I:

[8 Lectures]

Introduction to Entrepreneurship and the Entrepreneur: Meaning and concept of entrepreneurship, role of entrepreneurship in economic development, agencies in entrepreneurship management and future of entrepreneurship. Meaning of entrepreneur, the skills required to be an entrepreneur, the entrepreneurial decision process, and role models, mentors and support system.

Module-II:

[6 Lectures]

Business Opportunity Identification and preparing a Business Plan: Business ideas, methods of generating ideas, and opportunity recognition. Meaning and significance of a business plan, components of a business plan, and feasibility study.

Module-III:

[6 Lectures]

Financing & Launching the New venture: Importance of new venture financing, types of ownership securities, venture capital, types of debt securities, Choosing the legal form of new venture, protection of intellectual property, and marketing the new venture.

Total: 20 Lectures

Suggested Readings:

1. Hurdle: A book on Business planning: Tim Berry.
2. The one page Business Plan: Jim Horan.
3. The Complete Book of Business Plans: Joseph Covello.
4. Successful Business Plan: Rhonda Abrams.

5. The Founders Dilemmas: Noam Wasserman.

**MSUESN-402: Logistics & Supply chain
Management(Credit-2)**

Course outcomes (COs):

CO1: Relate the importance of Logistics and Supply Chain Management in today's business environment.

CO2: Model the process of smooth flow of goods and services and maximise value generated.

CO3: Examine the various subdivisions such as Warehousing, Inventory and compare the dependency of each such division with each other.

CO4: Estimate Demand forecasting and Material handling.

Theory:

Module-I:

[10 Lectures]

Logistics: Introduction (Evolution, Objectives, and Concept of Logistics). Components and Functions of Logistics Management, Distribution related Issues and Challenges; Gaining competitive advantage through Logistics Management. Role of Logistics in an Economy, Difference between Logistics and Supply Chain Management, Logistics and Competitive Advantage, Logistics Mix, Logistics in Organized Retail in India. Containerization, Cross docking. Warehousing: Concept and types, Warehousing strategy, Warehouse facility location & network design, Reverse logistics, Outsourcing- Nature and concept, Strategic decision to Outsourcing, Third party logistics (3PL), Fourth party logistics (4PL).

Module-II:

[10 Lectures]

Supply Chain Concepts: Objectives of a Supply Chain, Stages of Supply chain, Value Chain Process, Cycle view of Supply Chain Process, Key issues in SCM, logistics & SCM, Supply Chain Drivers and obstacles, Supply chain strategies, strategic fit, Best practices in SCM, Obstacles of streamlined SCM. Supply Chain Performance: Bullwhip effect and reduction, Performance measurement: Dimension, Tools of performance measurement, SCOR Model. Demand chain management, Global Supply chain- Challenges in establishing Global Supply Chain, Factors that influences designing Global Supply Chain Network. Supply Chain and CRM- Linkage, IT infrastructure used for Supply Chain and CRM, Functional components for CRM, Green supply chain management, Supply Chain sustainability.

Total: 20 Lectures

Suggested Readings:

1. Chopra, Sunil, Meindl, Peter and Kalra, D. V.; Supply Chain Management: Strategy, Planning and Operation; Pearson Education.
2. Altekar, Rahul V.; Supply Chain Management: Concepts and Cases; PHI Learning Reference Books.
3. Ballou, Ronald H.; Supply Chain Management; Pearson Education.
4. Sahay, B.S.; Supply Chain Management; Macmillan.
5. Ballou, R.H. Business Logistics Management. Prentice-Hall Inc.
6. Bowersox D.J., Closs D.J., Logistical Management, McGraw-Hill, 1996.

MSUFNS 481: Project Work (Credit: 10) (Sessional)

Objective: The students will be allotted with case studies in the area of food science and nutrition and they have to submit a detailed report after completion of the same and also give a presentation of the work at the end of the semester.

Course outcomes (COs):

CO1: Survey case studies in the area of food science and nutrition.

CO2: Apply these principles in practical problem-solving in food science and nutrition fields.

CO3: Discuss with professional organizations and scientific community with reasonable clarity on topics within food science and nutrition.

**MSUFNS-482: Practical Training Program & Report
Presentation (Credit-2) (Sessional)**

Objective:

To acquire in-plant knowledge and skill in hospital and explore the possibilities of preparation of diet charts, derive the nutritional assessment status which will be beneficial to societies at large.

Course Outcomes (COs)

CO1: Make use of knowledge gained from hospital training.

CO2: Develop innovative processes and products that will benefit both the industry and society as a whole.

**MSUFNS-483: Journal Club and Seminar Presentation in Relation to Recent Food
Science & Nutrition (Sessional)
(Credit-2)**

Objectives: Students will present the relevant field data of Recent Food Science & Nutrition through Seminar. With the help of Journal guidance they can gather relevant information. This part of course curriculum will not only help in gaining of subject knowledge also develops the speaking and discussion skills of students, strengthen discussion leadership abilities, develop

internet research skills, increase vocabulary knowledge, improve reading and listening comprehension, develop learner autonomy, & build confidence to use English for oral communicative purposes.

Course Outcomes (COs)

CO1: Outline the way of selection of journal and methods to present it related to food sector.

CO2: Explain and interpret the data of the journal to obtain sufficient knowledge out of it so that it can be used for future application

CO3: Apply previous knowledge and build concept to organize the technologies used in the journals to present in a very clear way

CO4: Analyze and compare the various methods and techniques used in different journals to make a complete presentation

CO5: Create various methods applying the technologies learnt in the journals for future work in the food research or industry.

MSUFSN-484: Grand
Viva(Credit-6)
(Sessional)

Objectives: The objective of comprehensive viva-voce is to assess the overall knowledge of the student in the relevant fields acquired over 2 years of study in the M.Sc. Food Science & Nutrition program.

Course outcome (CO):

CO1: Judge a student's entire knowledge in relevant subjects obtained over the course of two years in the M.Sc. Food Science & Nutrition program.

CO2: Solve real life problem situation with the entire knowledge about Food Science and Nutrition.