M.Sc in Food Science & Nutrition

SYLLABUS (2011-13)



P.G. DEPARTMENT OF HOME SCIENCE
SAMBALPUR UNIVERSITY
JYOTI VIHAR

Courses of Studies for the M. Sc Food Science & Nutrition Examination
(Under Course Credit Semester System)
Effective from First Semester Examination, 2011-12

1st Semester

Course No.	Title	Credit Hour
FSN. 411	Research Methodology	4 (Theory)
FSN. 412	Statistical Methods &Computer Application.	4 (Theory)
FSN. 413	Extension Education & Communication	4 (Theory)
FSN. 414	Environmental Management	4 (Theory)
FSN. 415	Practical related to 411&412	2 (Practical)
FSN. 416	Practical related to 413&414	2 (Practical)
	Total	**20**

IInd Semester

Course No.	Title	Credit Hour
FSN. 421	Advanced Food Science	4 (Theory)
FSN. 422	Food Microbiology	4 (Theory)
FSN. 423	Food Analysis	4 (Theory)
FSN. 424	Community Health Management	4 (Theory)
FSN. 425	Practical related to all the theory papers	3 (Practical)
FSN. 426	Writing of Term Paper & Seminar	1
	Total	**20**

IIIrd Semester

Course No.	Title	Credit Hour
FSN. 511	Advanced Human Physiology	4 (Theory)
FSN. 512	Therapeutic Nutrition	4 (Theory)
FSN. 513	Nutritional Biochemistry	4 (Theory)
FSN 514	Advanced Nutrition	4 (Theory)
FSN 515	Practical related to all the theory papers	2 (Practical)
FSN. 516	Dissertation (Writing of Synopsis &Field Work)	2
	Presentation through a seminar (to be completed in IVth Semester)	
	Total	**20**

IVth Semester(A candidate has to select any three elective theory papers)

Course No.	Title	Credit Hour
FSN. 521	Nutrition through lifecycle	4 (Theory elective)
FSN 522	Problems in Human Nutrition	4 (Theory elective)
FSN. 523	Food Processing Technologies	4 (Theory elective)
FSN. 524	Food Service Management	4 (Theory elective)
FSN 525	Nutrition & Health of Women	4 (Theory elective)
FSN. 526	Dissertation	6
FSN 527	Seminar	2
	Total	**20**

Instruction to Paper Setters

1.In theory papers questions will be set unit-wise with 2 questions from each unit (total 8 questions).The students shall answer any one question from each unit.
2.60% of the questions shall be long-answered type and 40% short-answered type

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DETAILED COURSES OF STUDIES

FIRST SEMESTER

Course No: FSN. 411 Research Methodology (Theory)

Unit-I: Research Methodology: Meaning, aim & objective of research, significance of Research, Role of Research , Types of Research, Research Process, Criteria of a good Research. Research Problem: what is a research problem, selecting the problem, technique involved in defining a problem, Thrust areas in research in Food Science & Nutrition.

Unit-II: Meaning need & feature of a good design. Different types of research design, Experimental Research Design. Sampling design, Census and sample survey, Steps in sampling design, characteristics of a good sampling design, Types of sampling design, sampling error, criteria for selecting a sampling design.

Unit-III: Data collection: Collection of primary data through different methods (Questionnaire, observation, Interview, case study, Sociometry, Anthropometry, Projective tests and other methods), Collection of Secondary data, Selection of appropriate method for data collection.

Unit-IV: Measurement & Scaling techniques: Measurement scales, Tests of Sound measurement, Techniques of developing measurement tools. Scaling: Meaning, scale classification bases, important scaling techniques, Scale construction techniques.

Books Recommended

1. Scientific Social Survey – P.V.Young.
2. Statistical Methods – S.P.Gupta, Sultan Chand & Sons Publisher- New Delhi
3. Research Methodology, Methods and Techniques – C.R. Kothari Wiley Eastern Limited – New Delhi
4. Elements of Statistics, Theory & Practice – M.Singhal. Lakshmi Narain Agarwal, Educational Publisher – Agra
5. An Introduction to Statistical Methods – C.B.Gupta & V.Gupta- Vikas Publishing House PVT Ltd. New Delhi.
6. Methodology and Techniques of Social Research – P.L.Bandarkar & T.S.Wilkinson –Himalaya Publishing House- Mumbai.
7. Research Methods & Measurements in Behavioural & Social Sciences – G.L.Bhatnagar – Agri. Cole. Publishing Academy, New Delhi.
8. Statistics in Psychology & Education – Henry, E. Garett, David Heley and Co.
9. Experimental Design in Psychological Research – Edwards
10. The Quality of Life: Valuation in social Research – R.Mukherjee – Sage publications, New Delhi
11. Fundamentals of Statistics- D.N.Elhance.
12. Statistics in Psychology & Education-Garrett & Word.
13. Research Method in Behavioural Science-S.M.Mohsin.
14. Methodology of Research-Kulbir Singh Sidhu.

Course No: FSN. 412 Statistics & Computer Applications 4CH

Unit-I: Classification & tabulation of Data: Meaning, objective and types of classification, formation of discrete and continuous frequency distribution, tabulation of data, parts of a table, General Rule of tabulation, Types of tables, Diagrammatical and graphical presentation of data: significance, types and limitation of different types of diagrams and graphs used for presentation of data.

Unit-II: Measure of Central tendency: Mean, Median, Mode and their uses with examples and their advantages and disadvantages, Measure of Dispersion: significance and methods used in studying dispersion (range, quartile deviation, mean deviation and standard deviations) with their uses, advantages and disadvantages.

Unit-III: Test of Relationship; Meaning, types and methods used to study correlation (simple Co-efficient of correlation, rank correlation, co-efficient of concurrent deviation and other methods), regression along with their uses, advantages & disadvantages. Testing of Hypothesis, Meaning, basic concept concerning testing of hypothesis, procedure for testing hypothesis, Errors in testing hypothesis.

Unit-IV: Parametric and Non-parametric tests: uses of chi square test, student't' test, and 'z' test in testing hypothesis. Analysis of variance Interpretation & Report writing; meaning, technique of interpretation, significance, steps followed, layout of report writing, Types of report and techniques of writing a report, The computer system, important characteristics and application in Research.

Books Recommended

Same as course no HS 411 of 1st Semester.

Course No: FSN. 413 Extension Education & Communication (Theory) 4CH

Unit-I: Extension Education: concept, philosophy, principles objectives and scope of extension education. Uniqueness of the extension programme in India, Objectives behind extension Education Programme, Broad objectives Financing, Extension as a programme & process, Field covered, characteristic of extension, Extension worker, Qualities of an extension worker, Extension worker as a communicator.

Unit-II:Programme planning: meaning, nature, principles & scope of programme planning, principles of programme planning applied to extension, objectives, steps for making a programme, ,Programme implementation :aspects of execution, facts responsible for the successful conduct of a programme, role of officials, non-officials and agencies in programme implementation. Evaluation: meaning, scope & purpose of evaluation, elements of evaluation process, uses of evaluation, steps involved, types of evaluation, criteria for evaluation, tools in evaluation.

Unit-III: Communication: Definition, meaning, nature, types and importance of communication, elements of communication, communication process, importance of communication in extension work, communication models, Communication of channels: Definition, dimensions , classification , and nature of channels, selection of communication channels. Communicator-communicatee, relationship and feed back in communication.

Unit-IV: Communication Approaches: motivating audience, basic principles and steps in teaching & learning in extension education, extension teaching methods, classification & factors involved in selection of appropriate methods, feature, advantages & limitations of different method of teaching (mass, group, individual). Audio-visual aids in communication, choice, planning, selection & types of visual aids, Audio aids & audio-visual aids, other teaching aids, contribution of audio-visual aids in extension teaching,

Books Recommended

1. Education & Communication for Development –O.P. Dahama & O.P.Bhatnagar – Oxford & IBH Publishing Co. PVT Ltd. New Delhi.
2. Extension & Rural Welfare – O.P.Dahama – Ram Prasad & Sons – Agra, Bhopal.
3. Extension Education – A. Adivi. Reddy- Sree Lakshmi Press, Baputla.
4. Extension – Third Dimension of Education – G. Pankajam – Gyan Publishing House – New Delhi.
5. A Hand Book of Education Extension – B.K.Chaubey – Jyoti Prakashan, Allahabad.
6. Text Book of Extension Education – R. Singh – Sahitya Kala Prakashan – Ludhiana.
7. Introduction to Extension Education – S.V. Supe – Oxford publishers – New Delhi.
8. Extension Communication & Management – G.L.Ray – Naya prakash, Calcutta.
9. Exploring of Extension Excellence – S.K.Waghmare – Multi Tech Publication. Company.
10. Extension Education in Community Development Ministry of Food & Agriculture, Govt. of India – New Delhi.
11. Rural Development Series – Agricultural Extension – Vol I & II – Basic Concepts & methods – Albrecsht. H. *et al.* Wiley Eastern limited.

Course No: FSN. 414 Environmental Management (Theory) 4CH

Unit-I: Environment: Components of environment, factors influencing environment, elements of environment. Atmospheres: (Troposphere, Mesosphere, Ionosphere, Exosphere, Hydrosphere, Lithosphere, Biosphere), Physico-chemical factors in the environment, changes in environment, National resources-conservation & sustainable development.

Unit-II: Population & Environment: population density, natality, mortality, Dispersion, age distribution, population growth curve, age pyramid, carrying capacity, community, structure, theories of climax community. Ecological succession pattern- types of succession, population growth & natural resources, Impact of population, growth on economic development & environment.

Unit-III: Environmental Pollution: Definition, types of pollutants, Agents causing pollution, classification, effects of pollution- Air pollution, sources, air pollutants, effects of air pollution & its control. Water Pollution: sources, water pollutants, effects of water pollution & its control. Noise Pollution: effect & control of noise pollution, Land degradation, causes, effect & control, waste disposal, legal provisions to control pollution.

Unit-IV: Environment and Public Health: Epidemiology, transmission of communicable diseases, water, air, vector and food borne diseases, diseases from animal to man, environmental pollution & community health, chemical insecticides & its impact on health, toxic action of metals & biological substances, sanitation measure to prevent & control the spread of diseases, vector control.

Books Recommended

1. Environmental Studies- A.K.Patra, Kalyani Publishers, New Delhi.
2. Fundamentals of Environmental Studies-S.N.Tripathy & Sunakar Panda, Vrinda Publications (P) Ltd, Delhi.
3. Environment & Society- P.C.Mishra & R.C.Das, Macmillan India Limited, New Delhi.
4. Fundamentals of Environmental Studies- N.K.Tripathy, Taratarinin Pushtakalaya, Berhampur, Orissa.
5. Man & Environment- M.C.Dash & P.C.Mishra, Macmillan India Limited, Kolkata.
6. A Text Book on Environmental Pollution & Control- H.S.Bhatia, New Delhi.
7. Environmental pollution & Development: Environmental Law, policy & Role of Judiciary- C.Pal, Mittal Publishers, New Delhi.
8. Sociology of Environment-S.N.Power & R.B.Patil, Rawat Publishers, Jaipur.
9. Environmental Education Problems & prospects- R.Ghanta & B.D.Rao, Discovery, New Delhi.
10. The Impact of Environmental Degradation on People- Philip viegs & Geeta Menon, Inidan social Institut, New Delhi.
11. Sustainable development & Environment, vol. I- Amit khanna De *et al.* , Cosmo Publisher, New Delhi.
12. Environmental Degradation: Socio-economic Consequences, I.S.Chauhan & A.Chauhan, Rawat Publishers, Jaipur.

Course No:FSN. 415 Practical related to FSN411 & FSN 412(Practical) 2CH
To be decided by the teachers council of the department

Course No: FSN. 416 Practical related to FSN 413 & FSN 414 (Practical) 2CH
To be decided by the teachers council of the department

SECOND SEMESTER

Course No: FSN. 421 Advanced Food Science 4CH

Unit-I: Food: Definition & function of food, food-groups Nutritive value of foods, RDA, for Indians in different age groups. Balanced diet; meal planning: objectives, factors affecting meal planning, enhancing the nutritive value of foods, Selection & storage of food; Food preparation: objective &, method of cooking, microwave cooking & changes in nutrient during cooking.

Unit-II: Study of different food products: beverages, fruits, vegetables, cereals & cereal products, pulses, nut, oils & fats, spices& condiments, milk and milk products, eggs, meat, poultry and other flesh product, sea food, sugar & confectionary. Study of proximity constituents, (crude fiber, moisture, crude fat, ash value, Ph & acidity, crude protein, minerals)

Unit-III Properties of food: physical properties, acid base & buffers, the chemical bond colloids, pigments & colours in food & their affect in food processing. Flavor in food: (taste, smell, visual, texture & flavour), food additives: need & type of additives, additives & food safety.

Unit-IV: Foods of Future: Food security, Special nutrients, Food processing & product Development, Regulating food processing and preservation through TQM and HACCP., Food fortification, GM food & their health implication, functional foods, organic foods, impact of WTO in food regulation.

Books Recommended

1. Food Facts and Principles -N. Shakuntala Manay & M. Shadaksharaswamy, New Age International (P) Limited, New Delhi.
2. Food Science – B.Srilakshmi, New Age international (P) Limited, New Delhi.
3. Essentials of Food & Nutrition-M.Swaminathan-vol I & vol II.
4. Nutrition: An Integrated Approach- Pike & Brown
5. Human Nutrition & Dietetics- Davidson Passmore & Edward.
6. Principles of Nutrition E.D Wilson,K.H.Fisher& M.C.Faqua
7. Nutrition & Dietetics- S. A..Joshi.
8. Normal & Therapeutic Nutrition- Robinson & Lawer – Oxford & IBH Publications.
9. Food Science- N.Potter & J.H.Hotchkiss- CBS Publishers & Distributors, New Delhi.
10. Encyclopedia of Food Science(1-3 volume) Anmol Publications.

Course No: FSN. 422 Food Microbiology 4CH

Unit-I: Food Spoilage: Causes of food spoilage. Microorganism in food (mold, yeast, bacteria): primary sources, morphology, cultural characteristics and biochemical activities, of microorganism, factors affecting growth & survival of microorganism in food, physical & chemical means to control microorganism, contamination & spoilage of foods (cereals, sugar, vegetables & fruits, meat, fish, eggs, milk),Methods of Isolation& detection of microorganism in food.

Unit-II: Food Preservation & processing: method of food preservation by Physical Methods (like heat treatments, cold treatment&, chilled storage, deep freezing, drying, Irradiation, high osmotic pressure High pressure processing) Chemical methods like (concentration, fermentation, preservatives), by natural anti microbial compound, biologically based preservation System& pro biotic bacteria & newer method of food preservation.

Unit-III: Food toxicology & food borne illness: Food hazards microbiological, nutritional, environmental, natural toxicants, pesticides, food additives, preservatives, food borne illness: (Clostridium, botulinum, Escherichia coli, Brucella, Bacillus, Salmonella, Staphylococcus) Non bacterial agent & food borne illness, (Helminths & Nematodes, protozoa, toxic algae, fungi & food borne viruses

Unit-IV: Quality Control& Food Safety: Quality attributes- physical, chemical, nutritional, microbial, and sensory; evaluation & their measurement; Sensory *vis-à-vis* instrumental methods for testing quality. Food Safety and Standards Act, 2006; Domestic regulations; Various organizations dealing with inspection, traceability and authentication, certification and quality assurance (PFA, FPO, MMPO, MPO, AGMARK, BIS) ,evaluation of food safety: food adulteration, control of food quality. (codex Alimentarius, Indian standards)

Books Recommended:

1. Food Microbiology – M.R.Adams & M.O.Moss, New Age International (P) Limited, New Delhi.
2. Food Facts and Principles -N. Shakuntala Manay & M. Shadaksharaswamy, New Age International (P) Limited, New Delhi.
3. Food Science – B.Srilakshmi, New Age international (P) Limited, New Delhi.
4. Food Microbiology – William C.Frazier, Tata McGraw Hill publishing Company limited, New Delhi.
5. Food processing and Preservation – G. Subhalakshmi & Shobha A. Udipi, New Age International (P) Limited, New Delhi.
6. General Microbiology – Power & Daginawala, Himalaya Publishing House, Mumbai. (vol-II)
7. Basic Food Microbiology – G. Banwart, CBS Publishing & Distributors.
8. Modern Food Microbiology – Jay, James, Aspen publishers.
9. Microbiology- M.I.Pelezar & R.D.Reid McGraw Hill Book Company, New York.
10. Food Hygiene & Sanitation – S.Roday- Tata McGraw Hill, New Delhi.

11. Food Science- N.Potter & J.H.Hotchkiss- CBS Publishers & Distributors, New Delhi.
12. A first course in food analysis: A.Y.Sathe, New Age International (P) Ltd Publishers.
13. Food poisoning & food hygiene: Hobbs & Giebert & Edward, Anmol Publications.
14. Modern Food Microbiology: J.M.Hay, CBS Publications & Distributions.
15. Food Adulteration: S.C.Wason.
16. Nutritional & toxicological aspects of food processing; Eds Walker &Walker & Quattrucci, E Toy loss & Francis, New York.
17. Food Hazards & Food Hygiene- S.Yadav.
18. Toxicological aspects of food: Eds. Miller Elsevier -scientific publications.
19. Food Quality Assurance: AVI Publications, W.A.Gould.
20. Quality control in food industry: Food science & technology: A series of monographs, Academy Press, London.
21. Food Analysis: Theory & practice-Y. Pomeranz & C.E.MeLoan, CBS Publications & Distributaries, New Delhi.

Course No: FSN. 423 Food Analysis (Theory) 4CH

Unit-1: Basic instrumentation: Basic calculation for solution preparation and buffer, Principle of sensor (pH meter), Dialysis, ultra filtration, Reverse osmosis. Centrifugation: Principle, Theory (RCF, Sedimentation coefficient) and types. Calorimetry: Bomb calorimeter, differential scanning calorimeter.

Unit-II: Separation technique & analysis: Electrophoresis: Paper & gel electrophoresis, PAGE,isoelectric focusing,2D electrophoresis, Immuno electrophoresis Chromatography: Theory & Principle, chromatographic parameter(partition coefficient, capacity factor, retention & dead time, resolution & their calculation),components of chromatography & types (paper, thin layer partition) Advance chromatography:GC,HPLC,HPTLC(principle, instrumentation & application).

Unit-III: Spectroscopic analysis of food components, Principle, instrumentation & application of Colorimetric (colorimeter,colourflex), UV-Vis spectrophotometer, Spetroflurometer, IR,NMR, Mass spectroscopy.

Unit-IV: Isotopic & immunotechniques: Principle & theory of isotopic method, types, measurement & detection of radioactivity, Autoradigraphy, Immunotechniques, Principle, antigen-antibody interaction, enzymatic immune assay, Different immuno techniques of antigen detection in food sample.

Books Recommended

1. Bioinstrumentation by . Veerakumari,
2. Biochemical & Molecular biology techniques. byWilson & Walker,
3. Food Chemistry, Aurand, L.W. and Woods, A.E. 1973.AVI, Westport.
4. Food Science, Birch, G.G., Cameron, A.G. and Spencer, M. 1986.3rd Ed. PergamonPress, New York.
5. Principles of Food Science: Part-I Food Chemistry. Fennema, O.R. Ed. 1976 Marcel Dekker, New York.
6. Food Chemistry. Meyer, L.H. 1973.East-West Press Pvt. Ltd., New Delhi.
7. Food Science. 3rd Ed Potter, N.N. 1978. AVI, Westport.
8. *Textbook of Human Nutrition*. Bamji MS, Rao NA & Reddy V. 2003 Oxford & IBH.
9. *Food Chemistry*. Belitz HD.1999 Springer Verlag.
10. *Principles of Food Chemistry*. DeMan JM. 1976 AVI.
11. *Food Chemistry*. Fennema OR.1996Marcel Dekker.
12. *Food Chemistry*. Meyer LH. 1987.CBS.
13. *Essentials of Foods and Nutrition*. Vol. II. Swaminathan M. 1974 Ganesh& Co.
14. Methods in Food Analysis. Joslyn, M.A. Ed. 1970.Academic Press, New York.
15. Developments in Food Analysis Techniques-1. Applied Science King, R.D. Ed. 1978Publishers Ltd., London.
16. Separation Methods in Biochemistry 2nd Ed Morris, C.J. and Morris, P. 1976. PitmanPub., London.
17. An Introduction to Practical Biochemistry. Plummer, D.T. 1971Mc-Graw Hill Pub.Co., New York.
18. A Manualof Laboratory Techniques. Raghuramulu, N., Madhavan Nair, K., and Kalyanasundaram, S. Ed.1983.National Institute of Nutrition, ICMR, Hyderabad.

Course No: FSN. 424. Community Health Management 4CH

Unit-I: Health: concept, definition, dimension & determinant of health, positive health, health situation in India, concept of disease, causation (Agent, host, environmental factors) concept and control & prevention, modes of intervention, Health Indices: fertility, indicator, vital statistics, mortality, morbidity & demographic indicator, Human development Index, Reproductive health index.

Unit-II: Health Care: Concept of health care, level of health care, changing concept, elements & principles of health care, health for all, national strategies, health care delivery system (primary health care) health care services & system, agencies (Govt. and Private) in delivery health care services, health programmes in India.

Unit-III: Health needs & problem: Health needs & problems related to sanitation & environment, personal hygiene, pollution, health needs of special groups-women, infants, children, adolescents, geriatric health needs & problems, problems related to communicable (malaria, cholera, typhoid, chicken pox, measles, mumps, influenza, hepatitis, poliomyelitis, tuberculosis) & non communicable (heart disease, hypertension, cancer, diabetes, obesity) diseases. Newer diseases.

Unit-IV: Health planning &Management: Health planning, health needs & demands, objectives, targets & goals, planning cycle, Health management: methods & techniques, health planning in India, Five year plans & health system in India. Health information: requirements, components, sources of health information, health regulation & acts, health legislation. Health Education: adoption of new ideas & practices, content & principles of health education, audio-visual aids in health education.

Books Recommended

1. Primary Health Care Vol I –III, P.R.Dutt, Gandhigram Institute of Rural Health & Family Welfare Trust, Ambathurai.
2. A Text Book of Community Health for Nurses, R.K.Manelkar, Vora Medical Publications, Mumbai.
3. Essentials of Community Health Nursing- K.Park M/S Banarasidas Bharat Jabalpur.
4. Text Book of Preventive & social Medicine- K. Park . M/S Banarasidas Bharat, Jabalpur.
5. Text Book of Public Health and Social Medicine- A.N.Ghei Lakshmi Book Store, New Delhi.
6. A Hand Book of Social & preventive Medicine- Y.P.Bedi, Atmaram & Sons, New Delhi.
7. Community Health in the United States- John D. Porterfield- Voice of American Forum-Lectures.
8. The Concept of Health- Donald A.read- Hobrook Press Inc, Boston.
9. Principles of Health Science- K.L.Jones, L.W. Shainberg & C.O. Byer- Harper & Row Publishers, New York.
10. Encyclopedia of Health & Nutrition- Anmol Publications New Delhi.
11. Health Promotion in Public- A. Bhatia, Anmol Publications, New Delhi
12. Health Education- U.K.Singh & A.K.Nayak.
13. Dynamics of Health Culture- T.Bir.

Course No: FSN. 425 Practical Related to all theory papers (Practical) 3CH

To be decided by the teachers council of the Department

Course No: FSN. 426 Writing of Term Paper & Seminar 1CH

In this paper the candidate shall prepare a Term Paper in consultation with the Supervisor (To be decided by the Teachers council). The candidate shall give a seminar presentation on the term paper. The evaluation of the term paper shall be made by the Supervisor & Teachers council (50% by the Supervisor and the rest 50% shall be by the Teachers' Council).

THIRD SEMESTER

Course No: FSN. 511 Advanced Human Physiology 4CH

Unt-I: Reticulo-endothelal system: functions, classification. Lymphatic System: functions, circulation. Circulatory system: blood, composition of blood cells, development & function of blood cells, blood clotting, blood grouping and hemoglobin, Heart: anatomy, cardiac cycle, blood pressure and factors affecting blood pressure.

Unit-II: Respiratory system: anatomy, physiology and mechanism of respiration, regulation of respiration. Digestive System: anatomy of gastrointestinal tract and accessory organs. Digestion& absorption of foods, regulation of appetite Role of liver, pancreas, gallbladder

Unit-III: Excretory system: anatomy, and function of kidney, formation, composition and excretion of urine. Role of kidney in water, electrolytes & acid base balance. Endocrine glands: structure & function, mode of action of hormones.

Unit-IV: Reproductive system: Structure& function of male & female reproductive organs. Physiological changes in pregnancy. Nervous System: anatomy and functions of brain, spinal cord, nerves, organization of central nervous system Musculoskeletal system: anatomy & function.

Books Recommended

1. Human Physiology. VolI &II -C.C.Chatterjee, Medical Allied agencies
2. The Human Body-CH.best&NB. Taylor.1989, ASI publication House
3. Text book of Medical Physiology-AC.Guyton, WB sounders
4. Medical laboratory technology-KL. Mukherjee. Tata Mcgrawhill
5. Ross & Wilson Anatomy & Physiology in Health & illness-KJW.Wilson&JS.Ross 1987, Churhill Livingstone.
6. Text book of Physiology-volI & II-AK.Jain, Avichal Publishing Co. New Delhi.
7. Review of Medical Physiology-WF>Ganong, Lange medical Publication

Course No: FSN. 512 Therapeutic Nutrition 4CH

Unt-I: Therapeutic Nutrition: Therapeutic adoption of normal diets (normal, soft & fluid diets) factors to be considered in planning therapeutic diets, drugs & diet inter-action, special feeding methods, pre& post operative diets, role of dietician, dietary calculation using food exchange lists, high & low calorie diet, high protein, high fat,& low carbohydrate diets.

Unit-II: Therapeutic Diets: Etiology, physiological disturbances, biochemical & clinical manifestations & dietary management of the followings Fever & infection, Allergy & skin disturbances (bland & fiber restricted diet) Peptic ulcer, gastritis, colitis (very low residue diet)

Unit-III: Therapeutic Diets: Etiology, Physiological disturbances, biochemical & clinical manifestations & dietary management of the followings Hepatitis & cirrhosis (High protein, high carbohydrate moderate fat or fat restricted diet) Diabetes mellitus (metabolic disorder) Diseases of kidney (Nephrosis, nephrosclerosis, glomerulonephiritis, uremia) (controlled protein, potassium & sodium diet)

Unit-IV: Therapeutic Diets: Etiology, physiological disturbances, clinical & biochemical manifestation and dietary management of cardio vascular disorder. Hyper-lipidemia & Antherosclorosis (fat controlled diet) Heart disease (sodium restricted diet) Hypertension, Diet & Cancer

Books Recommended

1. Nutrition and Dietetics – Subhangini A.Joshi – Tata McGraw-Hill Publishing Company Limited, New Delhi
2. Dietetics – B.Srilakshmi – New age international (P) limited New Delhi.
3. Clinical Dietetics and Nutrition – F.A. Antia, Oxford University Press, London.
4. Normal and Therapeutic Nutrition- C.H.Robinson, Oxford & IBH publishing Co. Calcutta.
5. Text Book of Human Nutrition- Mahtab S. Bamji, N.Rao & V. Reddy, Oxford & IBH Publishing Co. Pvt Ltd.
6. Essentials of Food and nutrition – M.Swaminathan, Vol I & II, The Bangalore Printing & Publishing Co. Ltd (BAPPCO)
7. Normal and Therapeutic nutrition- C.H. Robinson & M.R Lawler – Macmillen Publishing Co. New York.
8. Food, Nutrition & Diet Therapy-L.K.Mahan & Escott.Stump- W.B. Saunders Ltd
9. Applied Nutrition & Diet Therapy for Nurses- J Davis, K.Sherer- W.B.Saunders.Co
10. Nutrition& Diet Therapy- S.R.Williams-Times mirror Mosby college Publishing. Co.
11. Human Nutrition & Dietetics- J.S.Garrow ,W.P.T.James, A. Ralph –Churhill Livingstone.

Course No: FSN. 513 Nutritional Biochemistry 4CH

Unit-I: Chemistry and Nutritional Importance of Carbohydrates: definition, classification, structure, & nutritional importance. Digestion, absorption, Transportation and Metabolism of carbohydrates, (glycolysis, formation &fate of pyruvate, citric acid cycle, glycogenesis, Glycogenolysis, Gluconeogenesis, hexose monophosphate pathway), , Blood sugar level & equilibrium.

Unit-II: Chemistry & Nutritional Importance of: Amino acids& Proteins: Structure &, classification of amino acids, structure of protein, ,& their nutritional importance. Digestion, absorption transportation and metabolism of

Protein; (Nitrogen balance, transamination & deamination of protein, urea cycle, decarboxylation transmethylation and biosynthesis of protein),

Unit-III: Chemistry and Nutritional Importance of Lipids: definition, importance, fatty acids, structure & classifications& types of lipids, importance of lipo -protein, Digestion, absorption, transport and Metabolism of lipids, oxidation of fatty acids, fatty acid synthesis, metabolism of cholesterol, triacylglycerol and phospholipids, .

Unit-IV: Chemistry and Nutritional Importance of Nucleic acids: definition, components, nucleosides, nucleotides, structure of DNA & RNA, and types of RNA, Role of DNA & RNA in protein synthesis. metabolic pathways, regulation of metabolic pathways, integration of metabolism of carbohydrates, lipids & proteins Role of Vitamins, Minerals, Hormones in the metabolism of carbohydrates, Proteins, & lipids, Energy metabolism.

Books Recommended:

1. Fundamental of Biochemistry – A.C.Deb, New Central Book agency (P) Ltd, Calcutta).
2. Text Book of Medical Biochemistry –M.N Chaterjee & Rana Shinde, Jaypee Brothers, Medical Publishers (P) Ltd Bangalore.
3. Fundamentals of Biochemistry –J.L.Jain, S.Chand & Company Ltd, Ram Nagar, New Delhi.
4. Human Physiology Vol I – C.C.Chaterjee, Medical Allied agency, Mahatma Gandhi Road, Calcutta.
5. Human Nutrition & Dietetics – Davidson & Passmare
6. Lehninger's Principles of Biochemistry-D.L.Nelson & M.M.Cox, Macmillan Worth Publishers.
7. Outlines of Biochemistry-Conn,E.E.Stumpf, P.K.Brwning, G and Poi, John Wiley and Sons.
8. A manual of Laboratory techniques-Raghuramulu, N. Madhavan Nair and K.KalyanSundaram – NIN, ICMR.
9. Harpers Biochemistry- R.K.Murray, D.K.Granner, P.A. Mayes, V.W.Rodwell-Mac millan Worth Publishers
10. Text Book of Biochemistry with clinical correlation T.M.Devlin-Wiley Liss inc.

Course No: FSN. 514 Advanced Nutrition 4CH

Unit-I: Energy: Forms & determinants of energy, measurement of energy, Determination of energy value of food, total energy requirement, factors affecting energy requirement, Recommended dietary allowances, factors affecting RDA, principles of deriving RDA BMR, its determinants & factors affecting BMR, calculation of energy expenditure of an average man and woman, energy balance, regulation of body weight.

Unit-II: Nutrition: classification, functions, recommended dietary allowances, sources, and effect of deficiency of macro nutrients (carbohydrate, fats and proteins).& Vitamins & Minerals; (A, B complex, C,D,E & K)& all mineral elements , importance of water & Roughages in the diet. Water & electrolytes balance.

Unit-III: Nutritional Needs: Nutrition during infancy, childhood, adolescence and adult, nutrition during pregnancy & lactation, nutrition in later maturity period, nutrition and infection, nutrition and immunity, nutrition & stress.

Unit-IV: Nutritional Assessment: Assessment of nutritional status by direct & indirect methods, use of various methods for the assessment of nutritional status, anthropometric assessment, clinical examination, bio-physical or radiological measurement, functional assessment, laboratory & biochemical assessment, dietary assessment, vital health statistics.

Books Recommended

1. Human Nutrition and Dietetics – S. Davidson & R. Passmars.
2. Normal and Therapeutic Nutrition – C.H. Robinson, Oxford & IBH Publishing Co. Calcutta.
3. Essentials of Food and Nutrition – M. Swaminathan, vol. I & II, The Bangalore printing and Publishing Co. Ltd.
4. Human Nutrition and Dietetics – Davidson, Passmore, East wood, English Language Book Society (ELBS).
5. Nutrition and Dietetics – S.A.Joshi; Tata Mc Graw-Hill Publishing Company Limited, New Delhi.
6. Nutrition an Integrated approach – Pike and Brown
7. Dietetics – B.Srilakshmi; New age International (P) Limited, New Delhi.
8. Nutrient Requirements and Recommended Dietary Allowances for Indians – Indian Council of Medical Research, National Institute of Nutrition, Hyderabad.
9. Text Book of Human Nutrition – Mahtab. S. Bamji; N.Pralhad rao & Vinodini Reddy, Oxford & IBH Publishing Co. Pvt.Ltd
10. Principles of Nutrition – Fisher and Fuqua, wiley eastern Private Limited, New Delhi.

11. Modern Nutrition in Health & disease- M.E.Shils, J Olson, M.Shike & C.Roos- Williams7Williams A Beverly co. London
12. Recommended Dietary intake for Indians- ICMR
13. Nutritive value of Indian Foods-ICMR
14. Nutritional Status Assessment- Frindonza- Chapman & Hall, London.

Course No:FSN. 515 Practical related to all the theory papers 2CH

To be decided by the teachers council of the department

Course No:FSN. 516 Dissertation 2CH

(Writing of Synopsis, review of literature, Preparation of research tool & planning for the Field Work/ experimental work& Presentation through a seminar)

Each student has to submit a research proposal to carry out independent research on a topic decided in consultation with the supervisor, (nominated by the teacher's council of the department) to the head of the department in the beginning of the Third semester. The candidate has to write the synopsis of the work to be carried out, prepare appropriate tool for collection/ generation of data, and plan for the field work/ experimental work and make a presentation of this in the department before the faculty and research students for evaluation by the supervisor (50%) and teachers' council of the department (50%). The feedback and comments received during the seminar presentation shall be suitably incorporated in the work under the advice of the supervisor.

FOURTH SEMESTER

Course No: FSN. 521 Nutrition through Life cycle (Elective) 4CH

Unit-I: Nutrition in Adult hood period, on the basis of sex & activities, pregnancy: Physiological changes, weight gain, , food & nutrient requirements during pregnancy, impact of good nutrition on outcome of pregnancy, Complications of pregnancy& their nutritional management. Lactation: Physiology of lactation, impact of nutrition on milk production, food & nutritional requirement during lactation.

Unit-II: Infancy: Role of nutrition on physical, mental development, rate of growth, assessment of growth, nutrient requirement during in infancy. Feeding of infants: breast feeding, formula preparation, weaning and supplementary foods, Feeding of premature & low birth weight babies, Nutritional disorder and common ailments in infancy, immunization chart.

Unit-III: Pre school age: growth & development, - physical & mental-prevalence of malnutrition in preschool years,, food habits, Nutritional requirements during preschool years, growth & development during school age period , Nutritional requirements during school age Specific problem in feeding school children,

Unit-IV: Adolescence:, Physical & physiological changes, Nutritional requirement, Food preferences, & nutritional problems, Elderly: Physical & physiological changes, nutritional requirements. Problems of old age, nutrients influencing aging process.

Books Recommended

1. Human Nutriton and Dietetics- Davidson and Passmore
2. Preventive and Social Medicine- Park and Park, Banarasidas Bhanot Publishers, Prem nagar, Nagpur Road, Jabalpur.
3. Normal and Therapeutic nutrition - C.H.Robinson, Oxford &IBH Publishing Co.Calcutta.
4. Public Health and Hygiene- Y.P.Bedi, Atma ram & sons, Kashmere gate, Delhi.
5. Text Book of Public Health and Social Medicine- A.N.Ghei, Lakshmi Book Store, New Delhi.
6. Nutrition in Preventive Medicine- G.H.Beatin & J.M.Bengea-WHO.
7. Combating under Nutrition- Basic Issues & Practical Approaches, C.Gopalan, NFI Publications.
8. NFHS Survey I & II- International Institute for Population Studies, Mumbai.
9. Encyclopedia of Health & Nutrition- 1-6, Anmol Publications, New Delhi.
10. Introduction to Nutrition through out the life cycle, SR Williams, RS Worthington, EDsneholinka, P.pipes, JM ress & KL Mahal, Times Mirroe Mosby college publication
11. Text Book of Human Nutrition- M.S.Bamji, P.N.Rao & V. Reddy- Oxford & IBH Publishing Co. PVT Ltd.

Course No: FSN.522 Problems in Human Nutrition (Elective) 4CH

Unit-I: Nutritional Problems: Food for man, population & food crisis, hunger and appetite, malnutrition, effect of malnutrition on vulnerable section of society, impact of malnutrition on nutritional development, causes of malnutrition, ecology of malnutrition, world declaration & plan of action for nutrition.

Unit-II: Nutritional Diseases: Prevalence, etiology, biochemical & clinical manifestations, preventive & therapeutic measure for the following nutritional diseases.(PEM,VitaminA deficiency, B complex vitamin deficiencies, Nutritional anemia, and Iodine deficiency disorder, Ricket, osteomalacio, Osteoporosis, Flurosis).

Unit-III: Nutritional disease: Prevalence, etiology, biochemical& clinical manifestations, preventive & therapeutic measures for the following problems (Obesity & over weight, mineral deficiency disorder, metabolic disorder, cancer, chronic heart diseases, tuberculosis).

Unit-IV: Measures to combat malnutrition: National nutrition Policy & Programmes, Supplementary feeding programmes, Role of ICDS & national & international agencies in combating malnutrition (WHO, FAO, UNICEF,NIN, NFI, FNB, NNMB, CFTRI) Role of food technology in combating malnutrition (development of food mixtures, food fortification, food preservation & new foods).

Books Recommended

1. Clinical Dietetics and Nutrition-F.A.Antia, Oxford University Press, London.
2. Normal and Therapeutic nutrition-C.H.Robinson, Oxford & IBH Publishing Co, Calcutta.
3. Essentials of Food and Nutrition-M.Swaminathan, vol. I & II, The Bangalore printing & Publishing Co. Ltd (BAPPCO).
4. Nutrition Science – B.Srilakshmi-New Age international (P) Limited, New Delhi.
5. Dietetics-B.Srilakshmi- New Age International(P) Limited, New Delhi.
6. Nutrition & Dietetics – S.A Joshi, Tata McGraw Hill Publishing Company Limited, New Delhi.
7. Nutrition-Margaret. S.Chaney & L.Ross- Surjeet Publications, Kamla nagar, Delhi.
8. Text Book of Human Nutrition- M.S.Bamji, P.N.Rao & V. Reddy- Oxford & IBH Publishing Co. PVT Ltd.
9. Modern Nutrition in Health & Disease- M.E.Shils, J.A. Olson, N. Shike & A. C.Ross- Williams & Wilkins.
10. Recent Trends in Nutrition- C. Gopalan- Oxford University Press.
11. Nutrition in Preventive Medicine- G.H.Beaton, J.M.Bengoa-WHO.
12. Nutritional Problems of India- Shukla.
13. Toawrds Better Nutrition- Problems & Policies- C.Gopalan & S.Kaur, NFI Publications.
14. Women & Nutrition in India – C.Gopalan & s.Kaur- NFI Publications.Course

No: FSN. 523 Food Processing Technologies (Elective) 4CH

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

Unit-II: Processing Technology for preservation & production of variety food products,. Processing of cereals, legumes, oilseeds, fruits & vegetables.,

Unit-III: Processing Technology for milk & milk products, egg, meat, poultry,and fish, convenience foods, Technologies underlying in mutualsupplemenntation,enrichment, fortification, fermentation, malting, germination, food additives used in food industriesfor colour, flavour &as preservatives.

Unit-IV: Food packaging: Packaging materials & its advancement, Mass transfer in packing material, Innovation in food packing(active,passive,intelligent),Package testing, CA & MA, kinetics of reactions occurring in processed foods, reaction velocity constant, order of reaction; quality changes during storage of foods;

Books Recommended:

1. The technology of food preservation- NW Desrosier & JN Desrosier, AVI publication
2. Food processing-VH.Potty,&MJ Mulki Oxford & IBH publication
3. Food Scienc- B.Srilakshmi, New age International publication.
4. Modern processing, packaging,& Distribution System for food , AP, Frank, AVI Van nonstand Reinhold.co.
5. Food Science & Experimental foods- MS, Swaminathan- Ganesh &co.

Course No: FSN 524 Food Service Management (Elective) 4CH

Unit-I: Institutional Food Management: Development of Food service Institutions, Approaches to Management, Principles of management, functions of management, (Planning, organizing, directing, coordinating, controlling and evaluating) Management Process: Tools of Management**,** Management of resources, (money, space, materials' equipments, staff, time, energy and procedures).

Unit-II: Space Planning & Organizing: Kitchen spaces; Types of Kitchen, Kitchen plan, work simplification in kitchen, Designing and layout of kitchens. Storage space: Types of storage, planning & Layout of storage space, sanitation & safety, Service area planning and decoration of service areas.

Unit-III: Food Management: Characteristic , types & quality of foods, Food purchasing, Receiving and Storage of foods, Menu planning, Food production and processing. Effect of preparation and cooking methods, Large Quantity cooking techniques, Food Service: Style of Service & Types of Service. Environmental hygiene and sanitation, Waste disposal, Food handling practices, Personal hygiene Safety and security, Legal responsibilities of a food service institution, Food Standards

Unit-IV: Financial Management: Definition & Scope of application of Management accounting, Cost concept, Components of costs, Cost control, Pricing, Book keeping & accounting, Personnel Management: Recruitment, Selection, induction, employee facilities & benefits, Types of employee welfare Schemes, training and development of employees.

Books Recommended

1. Catering Management – an integrated approach- M.Sethi & S.Malhon, Wiley Eastern Limited,
2. Institutional food Management- MohiniSethi, New Age International Publishers, New delhi
3. Food Service in Institution-West wood harger & Shugarl.
4. Catering Management in the Technological age-Fuller Barrievd- Rock hiff Publications.
5. Personal Management in the Hotel& Catering Industries- Boella- Hutchinson Publications.
6. Food Service Systems & Administration- Hitchcock Macmillan Publication.
7. Hotel House Keeping Training Manual- Andrews Snoher-Tata McGraw Hill Publication-New Delhi.
8. The Practice of Hospitality Management _vol I and II –R.Lewis, T.Begg's M.Shaw & S.Croffot-AVI Publishing Co.DC.West Port Connecticut.
9. Hospitality & Catering- Ursula Jones & Newtons.

Course No: FSN. 525 Nutrition & Health of Women (Elective) 4CH

Unit-I: Women in family society & community: Demographic changes, menarche, marriage, fertility, morbidity, mortality, life expectancy, sex ratio, ageing & widowhood, women's role, their resources & contribution to family, society & community, effect of urbanization, industrialization, globalization & economic policies on women.

Unit-II: Women & Nutrition: Women & Nutrition in India, women's nutritional requirements & food needs, Nutrition in pregnancy & lactation, pattern of growth & development of Indian girls & body size of adult women, nutritional deficiency diseases in women, factors influencing women's nutritional status and improving the nutritional status through interventions.

Unit-III: Women & Health: Women & health system, health care facilities & health seeking behaviour of women, health maintenance for women, gender issues in health, disease pattern & reproductive health, safe motherhood, family planning, women & ageing, contraception, menopause, oestoporosis, chronic degenerative diseases, neurological problems in women, women & AIDS , women & cancer.

Unit-IV: Legislation, policies & programmes for women: CEDAW (convention on Elimination of all forms of Discrimination against women) WRLH (Women's Right to life & health) Women welfare programmes related to improving health & nutritional status of women, National nutrition programmes for women, National & voluntary agencies in improving the situation of women in India, Empowerment of women- Role of education & various national schemes.

Books Recommended

1. Health care of women & children in developing countries – H.M.Wallace & K.Giri, Third Party Publishing Co. Oakland, California.

2. Gender, Health & Sustainable development, IRDC.
3. Women & children in urban poverty – What way out? NGO Committee on UNICEF
4. NFHS Reports I & II
5. State of world's children UNICEF .
6. The impact of development policies on health _ A review of literature- D.E.C Weil, A.P. Alicbusan, J.F.Wilson, M.R. Reich & D.J.Bradley.
7. Women & Nutrition in India- C.Gopalan & S.Kaur – N.F.I, India.
8. Women & Nutrition – CBB Publishers & Distributors.
9. Health care of women – Leonide – L.Martin, J.B.Lippincott Company- New-York
10. Nutrition for health development : Progress & prospects on the eve of the 21st century, WHO/NHD/99.9 Geneva.

Course No: FSN. 526 Dissertation 6CH

Each student has to carry out the dissertation work immediately after registration in the Third Semester and submit the final dissertation containing Introduction, Literature review, objectives, Hypothesis, Methodology, Result & discussion , summary, conclusion , recommendation references etc for evaluation by one internal & one external examiner in the end of Fourth Semester .The candidate has to submit two copies and a soft copy of the final dissertation to the head of the department. The H.O.D will forward the dissertation to the examiner for evaluation. The valuation of dissertation shall be followed by an open Viva voce. In the final dissertation evaluation (6CH), 50% weight age shall be given to continuous evaluation during the dissertation work, 25% to the evaluation of content and rest 25% to seminar presentation & viva voce by the examiners.

Course No: FSN. 527 Seminar 2CH