DEPARTMENT OF HOME SCIENCE
S.V.U. COLLEGE OF SCIENCES
SRI VENKATESWARA UNIVERSITY: TIRUPATI

RESTRUCTURED CURRICULUM FOR M.Sc. HOME SCIENCE – FOOD SCIENCE NUTRITION AND DIETETICS (REGULAR) PROGRAMME TO BE IMPLEMENTED WITH EFFECT FROM THE ACADEMIC YEAR 2017-2018

SYLLABUS
Choice Based Credit System (CBCS)

Department Vision

To be a premiere centre for excellence in higher education in the areas of specialization fostering nurturing and building careers for students and to be an apex body playing a pivotal role in planning and monitoring community development.

Department Mission

The Department of Home Science is committed to empower the students in capacity building skills through teaching, research and community oriented extension activities, thereby widening the scope for self-development and Employability and preparing them as socially useful and responsible citizens.

The academic programmes, research and extension activities are planned and executed meticulously so as to reflect the vision and mission of the Department, focusing on the empowerment of students through quality education by updating syllabus with current trends and providing appropriate knowledge and skills compete at the global level. The Department through motivated staff always strives towards reaching proficiency through teaching and community oriented extension programmes.

Department Objectives

1. Enable the students to understand the interrelation of Food and Health,
2. To foster knowledge across the life span in inter connected Human Development factors to become efficient counselors and early childhood educators
3. Develop sensitivity towards the community problems and train the students in Extension and outreach activities.
4. To focus on training students in application of techniques to process and preserve the food.

The department of Home Science has been adopting the systematic procedure for development, revision and implementation of the curriculum for four different post-graduate programmes offered viz., **Food Science Nutrition and Dietetics (FSND), Human Development and Child Welfare (HDCW), Extension Management and Communication Technology (EMCT) and Food Technology (FT)**. The learning out comes of each course are framed such that they help

students to gain theoretical knowledge as well as skills to meet local, national and global trends. The curriculum of each course has practical, field visits, visit to institutions and a mandatory internship programme, which focus on imparting essential skills and hands-on experience and experiential learning thereby can excel when they get employment in Government and Non-Government Organizations to work individually as well as in teams. The cross-cutting issues namely, technology, gender, child rights, human values and professional ethics are incorporated in core theories and electives to enable the students to lead a purposeful and independent life filled with moral and ethical values. Majority of the courses offered across all programmes do focus on nurturing employability/entrepreneurship/skill development. The outcomes of each programme have the emphasis on commitment and contribution to the interest of the society as a whole and perform well in their careers.

Programme Objectives

To enable the students:

1. To provide human resource in the field of Food Science, Nutrition and dietetics to cater the needs of the Community at local, regional and National levels.
2. To give skill and hands on experience in the thrust areas of the programme and prepare students for research.
3. To give training both in theory and practical for higher studies and competitive exams.
4. To facilitate by giving quality education for employability, entrepreneurship and skill development.
5. To inculcate the corporate social responsibility by profession and personal development there by developing the community by various curriculum and cocurricular activities.
6. To conduct field studies, Internship and project work as part of curriculum for developing data base for interventions and further studies and help policy makers to improve the health status of the population in the community.

Programme Educational Objectives (PEO)

To enable students to:

1. Understand the relationships between Food Science, Nutrition and Metabolism.

2. Gain knowledge on fundamental science involved in Food science, food processing and preservation, food quality, developing diet plans for different age groups and disease conditions.
3. Acquire skills in applying knowledge of Food science, Nutrition, and therapeutic nutrition in community and human health.
4. Interpret nutritional research through informed knowledge of food science, nutrition and diet therapy in community and health.

Program outcomes

By studying Food Science Nutrition and Dietetics course the student is able to:

1. Apply knowledge in Food science nutrition and dietetics to understand the chemical components- nutrients and non-nutrient constituents their physico chemical and functional properties, spoilage, processing, preservation, packaging of different foods. To assess nutritional status of individuals in various life-cycle stages and determine nutrition-related problems and diseases by applying knowledge of metabolism and nutrient functions, food sources, and physiologic systems in community, hospital, and in any situations.

2. Identify and understand different problems related to food science, food microbiology, food adulteration and nutritional problems in different stages of life in health and disease- its consequences and dietary management and apply knowledge to tackle these problems.

3. Design food products applying the principles of food science and nutrition to meet the challenges of nutritional problems.

4. Conduct research in different fields of nutrition using human and animal models, designing new food products, food service establishments.

5. Apply appropriate techniques to design, process, preserve, analyze and authenticate the different components of foods and food products.

6. Function effectively in different facets as dietitian, quality control systems, food analysts, research and development, food product designing, different food service establishments, and policymaking.

7. Communicate effectively Nutrition information in person and with community. Acquire skills in writing research report, documentation, case studies, seminar presentations, group discussions, and marketing strategies.

8. Describe social and environmental dimensions within nutrition and the life sciences. Able to demonstrate the National and International food laws, regulations and safety standards in application of food additives to ensure safe food.

9. Know Professional and social ethics as researcher, dietitian, community mentor, food business operator.

10. Apply knowledge of Nutrition and food science for sustainable development of the society in terms of socio cultural aspects, attitudes, and practice balanced diet in health and disease, food quality and safety regulations, food adulteration, food safety and hygiene.

11. Develop and design their own food business plan in terms of food business operators and food service establishments.

12. Learn new concepts of Nutrition science in global perspective and prepare themselves for life long learning process.

SEMESTER-I

Sl. No.	Course Code	Components of Study	Title of the Course	No. of Credits	IA Marks	End SEM Exam Marks	Total
1	FSND-101	Core-Theory	Food Chemistry and Analysis	4	20	80	100
2	FSND-102	Core-Theory	Food Science and Experimental Foods	4	20	80	100
3	FSND-103	Core-Theory	Clinical Nutrition and Dietetics-I	4	20	80	100
4	FSND-104	Practical-I	Food Chemistry and Analysis Practical	2	-	-	50
5	FSND-105	Practical-II	Food Science and Experimental Foods Practical	2	-	-	50
6	FSND-106	Practical-III	Clinical Nutrition and Dietetics-I Practical	2	-	-	50
7	FSND-107	Compulsory Foundation	Essential of Food and Community Nutrition	2	10	40	50
6	FSND-108	Elective Foundation	Human Values and Professional Ethics-I	4	20	80	100
		Total		**24**			**600**

DEPARTMENT OF HOME SCIENCE
M. Sc. FOOD SCIENCE NUTRITION AND DIETETICS

CHOICE BASED CREDIT SYSTEM (CBCS)
(With effect from academic year 2017-18onwards for students admitted into First Semester)

SEMESTER – I

FSND 101: FOOD CHEMISTRY AND ANALYSIS
(Common to M.Sc. Food Science Nutrition & Dietetics and MS Food Technology Course)

Course Objectives

- Acquire knowledge on chemical composition of different foods.
- Understand the physical, chemical, and functional properties of foods.
- Know the principles and working applications of different analyticals techniques associated with food.
- Comprehensive knowledge on techniques of analysing the nutrient components in foods.

CORE –THEORY

UNIT-I: Water Chemistry and Dispersed Systems:

- Water chemistry – Chemistry of Water, Free, Bound And Entrapped Water, Water Activity And Moisture Determination.

- Dispersed systems – Liquid dispersions, Gels, Emulsions, Foams.

UNIT-II: Carbohydrates and Lipids

- Carbohydrates – Classification, structure, physic – chemical properties of monosaccharides- pentoses, and hexoses , oligosaccharides – Maltose, Lactose, sucrose and poly sacchharides – starch , cellulose.

- Lipids **–** Nomenclature, classification – Milk fats, Animal fats , vegetable fats - Physical properties – crystallization , plasticity ; Chemical properties – Thermal decomposition , hydrogenation, inter esterification.

UNIT-III: Proteins and Amino Acids

- Proteins and amino acids – Classification, structure, physical properties.

- Functional and Chemical properties – Protein hydration, solubility, interfacial properties Emulsification and foaming, Gelation , Dough formation.

UNIT-IV: Food Analysis

- Introduction to food analysis- Methods of sampling, Determination of total ash; Principles and methods of chemical analysis
  - Carbohydrates – qualitative and quantitative analysis of starch and sugars.
  - Proteins – Electrophoresis, micro- kjheldhal method.
  - Fats – analysis of solid and liquid fats, Rancidity.
  - Determination of vitamin and minerals – vitamin-C, iron, phosphorus , calcium.
- Basic principles and applications of spectroscopy- UV, UV- visible, AAS, AES, Electromagnetic Resonance.
- Chromatography- principles and applications of Chromatography- HPLC, GC/ MS and LC/ MS.

REFERENCES

1. Lillian Hoagland Meyer. (2019).Food Chemistry", First Edition, CBS publishers and Distributors, New Delhi.
2. Fennema R. (2019). Food Chemistry. Marcel Dekker Inc. New York.
3. Ranganna S. (2019). Handbook of analysis and quality control for fruits and vegetables, 2nd edition. Tata Mc Graw Hill.
4. Nielsen S.S. (2002). Introduction to the chemical analysis of foods, CBS Publishers and Distributers, Pvt. Ltd.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Acquire knowledge on the physico chemical properties of compounds in foods.

CO 2 Apply the functional properties of foods in processing and preservation.

CO 3 Perform skills in qualitative and quantitative estimation of nutrients in different foods.

CO 4 Describe the chemical components and their functions in Food applications.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO1	3	3			2	2						
CO2	3	3			2	3						
CO3	3				3	3		1				1
CO4	3				2	2		1				1

3-High, 2- Medium, 3- Low.

FSND 102: FOOD SCIENCE AND EXPERIMENTAL FOODS
(Common to MSc Food Science Nutrition & Dietetics and MS Food Technology Course)

Course Objectives

- Knowledge on Plant and Animal foods composition, processing and preservation of nutritive values.
- Understand the principles of cookery of different foods and methods of evaluation.
- Acquire Knowledge on different processing techniques on nutritive quality of foods.
- Knowledge on standardisation of foods for different processing techniques.

CORE THEORY

UNIT I: Foods of Plant Origin

- Cereals and cereal products: Starch: Structure, Characteristics of some food starches. Gelatinization, Factors effecting gelatinization. Modified food starches-Applications.
- Pectin and Gums-Functional roles in food products.
- Baking process - Cereal flours, flour mixes, dough and batter, Leavening agents-Applications
- Pulses and Legumes: Composition, Toxic constituents, processing, effect of cooking.
- Vegetables and Fruits: Classification, composition, Pigments and Flavors constituents - cooking effect, Browning reaction.

UNIT II : Foods of Animal Origin

- Milk: Composition, kinds of milk, milk products and Functional properties of Milk-Cooking applications.
- Egg: Structure, grading, quality and Functional properties of eggs, use in cookery-its effect.
- Meat and Poultry: Structure, Muscle composition, postmortem changes, Heat-induced changes in meat, tenderness – tenderizers. : Poultry classification.
- Fish and Marine foods: Classification and Composition, Selection and cooking.

UNIT III : Sugars and Fats

- Sugars, sugar crystals and Confections – Types of sugars and sugar syrups, Sugar cookery, Crystallization of sugars, Confectionery-Types and confections raw materials and their role, chocolate processing, Indian confectionery, sugar substitutes.

- Fats and oils -Sources, composition, Absorption, Functional properties of fat and uses in food Preparations, Rancidity, Fat substitutes or replacements.

UNIT IV: Food Evaluation

- Attributes of food quality-Subjective and objective evaluation.
- Sensory evaluation-Requirements-panel-sensory testing procedures and tests.
- Objective evaluation-Food Rheology-objective methods of food evaluation.

REFERENCE BOOKS:

1. Belle Lowe. (1998). Experimental Cookery, John Wiely& Sons, INC, New York.
2. Norman N Potter. (2007). Food Science, Fifth edition, An Aspen Publication, Mariland.
3. Griswold. R.M. (1962). The Experimental Study of Foods. Houghton and Mifflin company, Boston, New York,
4. Sethi Mohini. (2011). Food Science: Experiments and Application, second edition, Jain book Agency, New Delhi.
5. Vijayakhader. (2001). Text book of Food science and Technology, ICAR, New D
6. G. Subbulakshmi & Shobha A. Udipi. (2001). Food processing and preservation. New Age International (P) Ltd., Publishers Bangalore, Chennai.Hyderabad.
7. B. Srilakshmi. (2001). Food Science, 2nd edition New Age International (P) Ltd., Publishers, Bangalore, Chennai & Hyderabad.
8. Swaminathan, M. (1979). Food science and Experimental foods. Ganesh & Co., Madras.
9. N.ShakuntulaManay& M. Shadaksharswamy. (2001). Foods- Facts and Principles, second edition, New Age International Publishers, New Delhi.

Course Out Comes

Upon completion of this course, students will be able to

CO 1 Acquire knowledge on the functional properties of Plant and Animal foods.

CO 2 Standardize the weights and measures of various food items.

CO 3 Demonstrate the role of ingredients in cookery.

CO 4 Apply different techniques in evaluation of food.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3			2	2						2
CO2	3	3			2	2						2
CO3	3	3	2		2	3						1
CO4	3	3	2		3	3						1

3-High, 2- Medium, 1- Low

FSND 103: CLINICAL NUTRITION AND DIETETICS-I

Course Objectives

- Understand the concepts of nutritients its relation to health.
- Describe the role and responsibilities of Dietetian in Hospital.
- Knowledge on Therapeutic modification of diets and diet planning.
- Knowledge on diet planning for diseases and drug interactions.

CORE THEORY

UNIT I: Dietetics and Roles of Dietician:

Dietetics – Definition- a Dietician-role and responsibilities of dietician-Diet counseling-definition- theories and approaches to counseling, reality theory, behavioral counseling, cognitive- behavioral approaches- psycho education and rational emotive therapy, directive and non – directive counseling – counseling strategies: individual and group counseling.

Unit II: Therapeutic Diets-

Definitions-Normal and General diets – Therapeuticmodifications of diets-Planning therapeutic diets – use of food guides and food exchange systems. **Special feeding methods**: Enteral and Parenteral Nutrition-Types,methods and formulation feedings.

UNIT III: Dietary management in metabolic disorders

- **Diabetes Mellitus** – classification- Etiology- symptoms – Diagnosis- complications – management throughDiet – glycaemic index of foods - use of food exchange lists-Insulin- Exercise- Oral hypoglycemic drugs.

- **Gout and Inborn Errors of Metabolism**

  Gout: Etiology – Clinical symptoms – Role of Proteins and purines – Dietary management.

  Inborn errors of metabolism – phenyl ketonuria (PKU) maple syrup urine disease (MSUD) - Galactosemia – Tyrosinemia – Homosystinuria – Dietary management

- **Obesity and Underweight**

  Prevalence and Classification- Etiology-Energy Balance- Metabolic Aberrations and clinical Manifestations-Consequences

  Management of Obesity-Dietary and Lifestyle Modifications -Preventive Aspects

Underweight- Etiology- Metabolic Aberrations and clinical Manifestations-Dietary Management.

UNIT-IV: **Nutrition and Drug Interactions**: Effect of drugs on food intake, digestion and absorption-Effect of food and nutrients on drug digestion, absorption and metabolism.

TEXT BOOKS:

1. B. Srilakshmi. (2001).Dietetics, 4th edi. 1969, 3rd edi. New Age International (P) Ltd., Publishers Bangalore, Chennai, Hyderabad.
2. Whitney NE, Cataldo BC, Rolses RS. (1987).Understanding Normal and Clinical Nutrition" West Pub.Company. St Paul, New Yok, Los Angeles, San Fransisco.
3. Mahtabs.Bamji and N.Pralhad Rao. (2004).Text book of Human Nutrition, Second Edition, Oxford and IBH Publishing co. Pvt Ltd. New Delhi.
4. Michelle McGuire, Kathy A Beer man. (2011). Nutritional sciences From Fundamental to Food, Second Edition, Wadsworth Cengage Learning, Belmont, USA
5. Davidl. Katzwolters Kluwer/LippinCottWilliams and Wilkins. (2007). Nutrition in Clinical Practice Second Edition.
6. C.Gopalan, B.V.RamasastriandS.C.BalaSubramanian. (2012). Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council Medical Research Hyderbad.
7. Dr.M Swami Nathan. (2010). Food and Nutrition Volume-1 & 2 Second Edition the Bangalore Printing and Publishing Co Ltd Bangalore 560018.
8. Shubhangini A.Joshi. (2010). Nutrition and Dietetics Third Edition Tata Mecgraw Hill Education Private Limited New Delhi.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Apply the concepts of threupatic nutrition in different diseases.

CO 2 Calculation of Nutrients and modification of the diets for different diseases.

CO 3 Planning and preparation of diets for different disease conditions.

CO 4 Able to know patient Diet counselling.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2								2
CO2	3	3	3	2								2

CO3	3	3	3	3						2		1
CO4	3	3	3	3		3	3		2	2		1

3-High, 2- Medium, 1- Low

FSND-104 Practical-I Food Chemistry and Analysis Practical

Course Objectives

- Know the principles and working applications of different analyticals techniques associated with food.
- Comprehensive knowledge on techniques of analysing the nutrient components in foods.

PRACTICALS:

1. Volumetric analysis of acids and bases
2. Determination of moisture
3. Qualitative analysis of carbohydrates, Hydrolysis of Starch.
4. Determination of starch and sugars
5. Qualitative analysis of proteins and amino acids
6. Estimation of proteins - Micro- Kjheldhal method
7. Separation of proteins and amino acids – Electrophoresis
8. Qualitative analysis of fats and oils.
9. Determination of fat in solid and liquid foods.
10. Determination of Total ash
11. Estimation of calcium
12. Estimation of phosphorus
13. Estimation of Iron
14. Estimation of vitamin C
15. Demonstration of estimation of minerals using atomic absorption spectro photometer (AAS or AES).

Course Out comes

Upon completion of this course, students will be able to

CO 1 Perform skills in qualitative and quantitative estimation of nutrients in different foods.

CO 2 Describe the chemical components and their functions in Food applications.

FSND-105 Practical-II Food Science and Experimental Foods Practical

Course Objectives

- Acquire Knowledge on different processing techniques on nutritive quality of foods.
- Knowledge on standardisation of foods for different processing techniques.

PRACTICALS:

1. Standardization of weights and measures of various foods
2. Starch cookery- Structure, gelatinization and factors affecting gelatinization
3. Baking –Determination of gluten content, Preparation of plain cake, Bread and evaluation by subjective and objective methods.
4. Pulse cookery – effect of different processing methods-Soaking, germination, malting-effect of factors.
5. Vegetable cookery – Effect of time, temperature, media and cooking methods on pigments.
6. Fruit - Enzymatic Browning- Effect
7. Sugars and confections: Factors affecting crystallization in candies like fondant, experiments on applying scientific methods to Indian confectionary, preparation of confections – role of ingredients and processing of confectionary.
8. Fats and oils – Smoke points, oil absorption and stability of emulsion – mayonnaise.
9. Milk cookery: preparation of milk products-Effect of cooking.
10. Egg cookery: Egg white foams: preparation of the eggs acting as binding, emulsifying and thinking agent.
11. Meat cookery : Effect of different cooking methods and tenderizers
12. Fish cookery, and other marine foods.
13. Sensory evaluation of food
14. Objective evaluation of food

Course Out Comes

Upon completion of this course, students will be able to

CO 1 Demonstrate the role of ingredients in cookery.

CO 2 Apply different techniques in evaluation of food.

FSND-106 Practical-III Clinical Nutrition and Dietetics-I Practical

Course Objectives

- Knowledge on Therapeutic modification of diets and diet planning.
- Knowledge on diet planning for diseases and drug interactions.

PRACTICALS:

1. Visit the local hospitals to study food preparation and service to patients.
2. Planning of therapeutic modification of different diets.
3. Preparation of therapeutic modification of different diets.
4. Visits to hospitals (6 Practical Sessions) to collect case reports.
5. To prescribe the diets for the patients from different wards and do diet counseling.
6. Preparation of diets related to case study and Presentation of case reports.
7. Planning and preparation of different RT Feeds.
8. Use of food exchange lists in planning therapeutic diets.
9. Planning of diabetic diets for different age groups.
10. Preparation of diabetic diets for different age groups.
11. Planning of high fiber and low carbohydrate diets for different grades of obese patients.
12. Preparation of high fiber and low carbohydrate diets for different grades of obese patients.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Planning and preparation of diets for different disease conditions.

CO 2 Able to know patient Diet counselling.

FSND 107: ESSENTIALS OF FOOD AND COMMUNITY NUTRITION
(Common to M.Sc Food Science Nutrition & Dietetics and MS Food Technology Course)

Course Objectives

- Knowledge about nutrients in food and their functions.
- Understand the consequences of deficiency of taking nutrients.
- Comprehensive knowledge on the role of nutrients in different stages of human life.
- Knowledge about the different methods of nutritional assessment.

COMPULSORY FOUNDATION- THEORY

UNIT-I : Food Composition and its essentials

- Food groups – Classification – food composition and nutritive values of different foods, Functions of foods. Balanced Diet.
- Nutrition through life span – Infancy, Pre-school children, childhood, Adolescence, Adulthood and Ageing – Nutritional requirements and RDA– Justification for special needs during periods of growth and development, pregnancy and lactation – significance of breast feeding – Principles of menu planning appropriate to age and stage of life span.

UNIT-II : Community Nutrition

- Macronutrients and micronutrients – Carbohydrates, protein, fats, vitamins (A, D, E, K, C and B complex) and minerals (Calcium, phosphorous, sodium, Iron, zinc, Iodine and fluorine) - Definition, classification, food sources, Recommended Daily Allowance (RDA), biological functions, deficiency diseases and its symptoms.
- Methods of Assessment: Direct and Indirect methods of Nutritional assessment of human groups, Techniques for assessment of age and use of reference standards for the assessment of nutritional status.
- Government Nutrition Programmes- ICDS and Mid Day Meal Programme (MDMP

LEARNING EXPERIENCES

1. Assessment of Nutritional Status using Anthropometry, Dietary and Clinical methods.
2. Planning of Diets for Different Age Groups and Physiological Conditions.
3. Planning Diets for Different Nutritional Deficiencies like PEM, Iron Vitamin-A, Obesity.
4. Planning and Preparation of Programmes for Significant Days like Breast Feeding Week Nutrition Week, World Food Day.
5. School Lunch Programme at Sri Venkateswara University Laboratory Nursery School.
6. Preparation of Visual Aids for Nutrition Education, and Method Demonstration on a Nutrition Recipe.

REFERENCES - TEXT BOOKS

1. Jelliffe, D.B. (1966).Assessment of Nutritional Status of the Community, WHO Monograph. Series No. 53. WHO Geneva.

2. Swaminathan, M. (2010). Essentials of Food and Nutrition, Vol. I and Vol. II Ganesh and co. Madras.
3. Mahtabs. Bamji and N.Pralhad Rao . (2010). Text book of Human Nutrition, Second Edition, Oxford and IBH Publishing co. Pvt Ltd. New Delhi.

4. Michelle McGuire, Kathy A Beer man. (2011). Nutritional sciences From Fundamental to Food, Second Edition, Wadsworth Cengage Learning, Belmont, USA.
5. C.Gopalan, B.V.RamasastriandS.C.BalaSubramanian.(2012). Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council Medical Research Hyderbad.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Know the nutritional problems of the community.

CO 2 Acquire knowledge about food groups, RDA and steps in planning a diet.

CO 3 Skills in planning and claculating nutritive values for the foods and recipes.

CO 4 Identify the signs and symptoms of different nutrient disorders in community.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO1	3	3		2			2					2
CO2	3	3	3	2			3					2
CO3	3	3	3	2					2			2
CO4	3	3	3	2			3		2			2

3-High, 2- Medium, 1- Low

FSND108: HUMAN VALUES AND PROFESSIONAL ETHICS - I
(Revised Syllabus with effect from 2017-2018)

Course Objectives

This course helps the students to;

1. Define the term 'ethics' , 'good and bad values', crime and punishment and religious tolerance.
2. Understand the importance of good character, conduct and values embedded in various religions.
3. Apply knowledge of professional ethics and correlate the concepts in addressing the ethical issues outside the class room .
4. Demonstrate knowledge of ethical values in non-class room activities, internships and field work and resolve the moral issues. .

ELECTIVE FOUNDATION-THEORY

Unit-I:

Definition and Nature of Ethics- Its relation to Religion, Politics, Business, Legal, Medical and Environment.Need and Importance of Professional Ethics - Goals - Ethical Values in various Professions.

Unit-II:

Nature of Values- Good and Bad, Ends and Means, Actual and potential Values, Objective and Subjective Values, Analysis of basic moral concepts- right, ought, duty, obligation, justice, responsibility and freedom. Good behavior and respect for elders, Character and Conduct.

Unit-III:

Ahimsa (Non- Violence), Satya (Truth), Brahmacharya (Celibacy), Asteya (Non-possession) and Aparigraha(Non- stealing). Purusharthas(Cardinal virtues)-Dharma (Righteousness), Artha (Wealth), Kama(Fulfillment Bodily Desires). Moksha (Liberation).

Unit-IV:

Bhagavad Gita- (a) Niskama karma. (b) Buddhism- The Four Noble Truths – AryaAstangamarga, (c) Jainism- mahavratas and anuvratas. Values Embedded in Various Religions, Religious Tolerance, Gandhian Ethics.

Unit-V:

Crime and Theories of punishment- (a) Reformative, Retributive and Deterrent. (b)

Views on manu and Yajnavalkya.

REFERENCES:

1. John S Mackenjie: A manual of ethics.
2. The Ethics of Management" by Larue Tone Hosmer. Richard D. Irwin Inc.
3. "Management Ethics' integrity at work' by Joseph A. Petrick and John F. Quinn. Response Books: New Delhi.
4. "Ethics in Management" by S.A. Sherlekar, Himalaya Publishing House.
5. Harold H. Titus: Ethics for Today
6. Maitra, S.K: Hindu Ethics
7. William Lilly: Introduction to Ethics
8. Sinha: A Manual of Ethics
9. Manu: Manava Dharma Sastra or the Institute of Manu: Comprising the Indian System of Duties: Religious and Civil (ed.) G.C.Halighton.
10. SusrptaSamhita: Tr.KavirajKunjanlal, KunjalalBrishagratha. Chowkarnba Sanskrit series. VolLlI and Ill, Varnasi, Vol I 00,16'20,21-32 and 74-77 only.
11. CarakaSamhita :Tr.Dr. Ram Karan Sarma and VaidyaBhagavan Dash, Chowkambha Sanskrit Series office. Varanasi I, 11.111 VolIPP 183-191.
12. Ethics, Theory and Contemporary Issues. Barbara Mackinnon Wadsworth/Thomson Learning, 2001.
13. Analyzing Moral.Issues, Judith A. Boss. May Field Publishing Company - 1999.
14. An Introduction to Applied Ethics (Ed.) John H.Piet and Ayodhya Prasad. Cosmo Publications
15. Text Book for Intermediate First Year Ethics and Human Values. Board of Intermediate Education- Telugu ~ Akademi, Hyderabad.
16. I.C Sharma Ethical Philosophy of India. Nagin& co Julundhar

Course Outcomes:

After studying the course, students will able to ;

CO1. Define the term ‘ethics’ , ‘good and bad values’, crime and punishment and religious tolerance.

CO2. Understand the importance of goodcharacter, conduct and values embedded in various religions.

CO3. Apply knowledge of professional ethics and correlate the concepts in addressing the ethical issues outside the class room.

CO4. Demonstrate the ability to face difficult situations in non-class room activities, internships and field work and resolve them confidently.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3				3	2			3	2		1
CO2	3				3	2			3	2		1

CO3	3				3	2			3	2		1
CO4	3				3	2			3			1

3-High, 2- Medium, 1- Low

SEMESTER-II

Sl. No.	Course Code	Components of Study	Title of the Course	No. of Credits	IA Marks	End SEM Exam Marks	Total
1	FSND-201	Core-Theory	Nutritional Bio chemistry	4	20	80	100
2	FSND-202	Core-Theory	Food Microbiology and Safety	4	20	80	100
3	FSND-203	Core-Theory	Clinical Nutrition and Dietetics-II	4	20	80	100
4	FSND-204	Practical-I	Nutritional Bio chemistry Practical	2	-	-	50
5	FSND-205	Practical-II	Food Microbiology and Safety Practical	2	-	-	50
6	FSND-206	Practical-III	Clinical Nutrition and Dietetics-II Practical	2	-	-	50
7	FSND-207	Compulsory Foundation	Research Methodology	2	10	40	50
6	FSND-208	Elective Foundation	Human Values and Professional Ethics-II	4	20	80	100
		Total		**24**			**600**

FSND 201: NUTRITIONAL BIOCHEMISTRY

Course Objectives

- Understand the metabolism of nutrients in human physiology.
- Acquire knowledge on factors affecting digestion ,absorption of nutrients.
- Creating awareness on enzymes and its role in nutrient metabolism.
- Knowledge on role of therapeutic nutrition/diets in person to person metabolism.

CORE THEORY

UNIT - I

Metabolism of carbohydrates and lipids

- **Cabohydrates :**Sources, structure, functions, digestion and absorption of carbohydrates. Carbohydrate metabolism- Glycolysis, Tricarboxylic acid cycle, Glycogenolysis and Gluconeogenesis.
- **Lipids** :Sources, structure, functions, digestion and absorptionof lipids. βoxidation of fatty acids and Cholesterol Metabolism. Lipids of biological significance - Lipoproteins and prostaglandins in health and disease.

UNIT – II

Proteins and Amino Acids

- Classification of amino acids – peptides and proteins.Metabolism of amino acids - Amino Acid decarboxylation, Tran's peptidation. Formation and Disposal of Ammonia - Hepatic coma, creatine and Creatinine - biosynthesis.
- Nucleic acid - DNA, RNA, Bases - Purines and Pyrimidines, Synthesis of Nucleic Acids - Steps of replication - Initiation, Elongation and Termination. Protein biosynthesis.
- Enzymes – Classification and structure of enzymes, Principal coenzymes in the metabolism of Nutrients.
- Hormones -Classification and functions of hormones. Hormones of significance in nutrient metabolism.

UNIT - III

Vitamins: An overview of sources, physiological functions and requirements of fat soluble and water soluble vitamins. Deficiency stages of vitamins.

UNIT – IV

Minerals and Trace elements : An overview of sources, Physiological functions and requirements of Calcium, Phosphorus, Iron, Iodine, Zinc, Sodium, Potassium and Chloride Flourine and the Electrolytes. Deficiency stages of minerals.

REFERENCES:

1. Keith Wilson and John Walker.)2000). Practical Biochemistry Principles and Techniques". 5th Edition.Cambridge University Press.
2. David L. Nelson and Michael M. cox. Lehninger. (2001). Principles of Biochemistry, 3rd Edn. MacMillan worth Publishers.
3. Talwar G.P. (1989). Text book of Biochemistry and Human Biology" 2nd Edn. National Book Trust in India.
4. Nath R.L. (1996). Text book of Medicinal Biochemistry. New age International (P) Limited, Publishers, New Delhi.
5. Harold Varley. (2010).Practical Clinical Biochemistry"-4th Edn.CBS.Publishes. Delhi.
6. Jayaraman, J. (1981). Laboratory Manual in Biochemistry," New Age International Publishers.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Understand the metabolism of food and nutrients in humans.

CO 2 Know metabolism of nutrients in healthy and disease individuals.

CO 3 Acquire skills in Qualitative and quantitative estimation of metabolites in biological fluids.

CO 4 Know Skills in analysing enzymes and its metabolites.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H		H								
CO2	H	H		H								
CO3	H			H	H	2						2
CO4	H			H	H	2						2

3-High, 2- Medium, 1- Low

FSND 202: FOOD MICROBIOLOGY AND SAFETY

(Common to MSc Food Science Nutrition & Dietetics and MS Food Technology Course)

Course Objectives

- Understand important pathogens and spoilage microorganisms in foods and the conditions under which they will grow.
- Knowledge on the conditions under which the important pathogens are commonly inactivated, killed or made harmless in foods.
- Acquire knowledge on laboratory techniques to identify microorganisms in food.
- Creating awareness on role and significance of microbial inactivation, adaptation and environmental factors (i.e., aW, pH, temperature) on growth and response of microorganisms in various environments.

CORE- THEORY

UNIT-I: Food and microorganisms:

Food as a substrate for microorganisms: factors affecting microbial growth-physical-chemical - biological.

Bacteria, Molds, Yeasts and Viruses: General characteristics, classification – morphological characteristics – cultural characteristics. Significance of food microbiology

UNIT-II: Food Spoilage

Microorganisms causing spoilage – chemical- physical - physiological changes caused by microorganisms.

Spoilage: Different types of food spoilages.

UNIT III:

Natural and environmental contaminants - Food contamination- Sources of contamination in:

- Cereals, Legumes, nuts and oil seeds.
- Sugars and sugar products.
- Fruits and Vegetable products.
- Milk and Milk products.
- Spices and condiments
- Eggs, poultry and Meat.
- Fish and Other sea foods.
- Processed foods.

UNIT-IV

Food safety: concept- factors affecting food safety –physical- chemical – biological hazards.

Food hazards of microbial origin – food borne disease- food borne intoxications- food borne infections.

REFERENCES:

1. William.C.Frazier and Denni, S.C. Westhoff. (2004). *Food Microbiology*, 4th edition, Tata MCGraw-Hill publishing company Ltd, New Delhi.
2. Adams,M.R. and Moss,M.O.(2003). *Food Microbiology*, Second edition, Panima Publishing Corporation, New Delhi.
3. George J. Banwart. (2002). *Basic Food Microbiology,* Second edition, CBS Publishers and Distributors, New Delhi, 2002.
4. James,M.Jay.(2005). Modern *Food Microbiology*, 4th edition, CBS publishers and Distributors, New Delhi.
5. Neelima,G., Garg,K.L. and Mukerji, K.G.*Laboratory manual of food microbiology*, I.K. International Publishing House Pvt.Ltd.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Identify the important pathogens and spoilage microorganisms in foods.

CO 2 Categorize the conditions under which the important pathogens are commonly inactivated, killed or made harmless in foods.

CO 3 Apply techniques to identify different micro organisms in foods.

CO 4 Compare the role and significance of microbial inactivation, adaptation and environmental factors (i.e., aw, pH, temperature) on growth and response of microorganisms in various environments.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2									
CO2	3	3	2									
CO3	3	3	2	2	2	2						2
CO4	3	3	2	2	2	2						2

3-High, 2- Medium, 1- Low

FSND 203: CLINICAL NUTRITION AND DIETETICS-II

Course Objectives

- Understand the diet principles for gastro intestinal, cardio vascular, renal, and other major diseases.
- Knowledge on diet principle for Surgical patients.
- Comprehensive knowledge in Dietary modifications for the management of diseases.
- Creating Knowledge in preparation and service of diets to these patients.

CORE THEORY

UNIT I: Dietary Management in-

i. Gastro intestinal Disorders

Gastro Intestinal system-physiology, Risk factors

- Diseases of the Upper Gastro intestine Dysphagia-Gastro Esophageal Reflux Disease (GERD).
- Diseases of the Stomach: Gastritis, Peptic Ulcer- Dumping syndrome.
- Diseases of intestine: Inflammatory bowel disease, Celiac disease, ulcerative colitis.
- Common GI problems: Diarrhea, constipation, Flatulence, Food sensitivities.

ii. Disorders of Liver, Gall Bladder and Pancreas

Physiology, Risk factors

- Disorder of liver: fatty liver, Hepatitis, cirrhosis, Hepatic coma.
- Gallbladder Disorders**:** Chollelithiasis- Choledocholilithiosis- Cholecystitis.
- Disorder of pancreas: pancreatitis, cystic fibrosis.

UNIT II: Dietary Management in –

i. Cardiovascular Disorders -

The circulatory system, Physiology, Risk factors

- Common Disorders: Dyslipidemia, Atherosclerosis, Coronary Heart disease (CHD), Hypertension (HT), Congestive Heart Failure, Angina pectoris, myocardial infraction (MI), Rheumatic Heart Disease (RHD).

ii. Kidney Diseases-

The Excretory System, physiology, risk factors

- Renal disorders, nephritic syndrome, glomerular nephritis, chronic renal failure, urinary calculi, urinary tract infection, dialysis.

UNIT-III: Dietary Management in Specific diseases /conditions

i. Nutrition during specific diseases
   a. Cancer: Introduction, Types, Etiology, Risk factors, metabolic consequences, Nutrition in prevention, treatment and management of cancer.
   b. AIDS: Introduction, classification, Etiology, Risk factors, metabolic consequences, Nutrition in prevention, treatment and management of AIDS.

UNIT-IV: Nutrition in Stress, Infection and burns

- Introduction, type of stress, metabolism, Nutrition in stress.
- Nutrition for surgical patient- pre and post surgery- nutrition for infected patient.
- Nutrition for patient with burns-nutritional needs, goals for meeting nutritional needs-nutrition support and management.

PRACTICALS:

1. Planning of diets for gastritis, peptic ulcer, diarrhea and constipation.
2. Preparation of diets for peptic ulcer, diarrhea and constipation.
3. Planning of diets for cirrhosis of liver and hepatitis for different age groups.
4. Preparation of diets for cirrhosis of liver and hepatitis for different age groups.
5. Planning of fiber rich and antioxidant rich diets.
6. Preparation of fiber rich and antioxidant rich diets.
7. Planning of diets for hypertension, coronary heart disease (CHD) and myocardial infarction (MI) for different age groups.
8. Preparation of diets for hypertension, coronary heart disease (CHD) and myocardial infarction (MI) for different age groups.
9. Planning of diets for nephritic syndrome, glomerulonephritis and urinary calculi.
10. Preparation of diets for nephritic syndrome, glomerulonephritis and urinary calculi.
11. Planning of low carbohydrate, low fat and high PUFA diets.
12. Preparation of low carbohydrate, low fat and high PUFA diets.
13. Planning of diets for burns patients and post-operative patients.
14. Preparation of diets for burns patients and post-operative patients.

REFERENCE BOOKS:

B. Srilakshmi. (2001).Dietetics, 4th edi. 1969, 3rd edi. New Age International (P) Ltd., Publishers Bangalore, Chennai, Hyderabad.

Whitney NE, Cataldo BC, Rolses RS. (1987).Understanding Normal and Clinical Nutrition" West Pub.Company. St Paul, New Yok, Los Angeles, San Fransisco.

Mahtabs.Bamji and N.Pralhad Rao. (2004).Text book of Human Nutrition, Second Edition, Oxford and IBH Publishing co. Pvt Ltd. New Delhi.
Michelle McGuire, Kathy A Beer man. (2011). Nutritional sciences From Fundamental to Food, Second Edition, Wadsworth Cengage Learning, Belmont, USA
C.Gopalan, B.V.RamasastriandS.C.BalaSubramanian. (2012). Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council Medical Research Hyderbad.

1. Nutrient Requirements and Recommended Dietary Allowance for Indians A Report of the Expert Group of ICMR. 2010.
2. Dr.M Swami Nathan. (2010). Food and Nutrition Volume-2 Second Edition the Bangalore Printing and Publishing Co Ltd Bangalore 560018.
3. Shubhangini A.Joshi. (2010). Nutrition and Dietetics Third Edition Tata Mecgraw Hill Education Private Limited New Delhi.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Apply the concepts of threupatic modification of diets for the diseases.

CO 2 Calculate nutrients and modifiy diets for the diseases.

CO 3 Skills in Planning and preparation of diets for different disease conditions.

CO 4 Able to know patient Diet service management and counselling.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3				2	2		2	2		2
CO2	3	3				2	2		2	2		2
CO3	3	3	2	3		3	3		3	2		2
CO4	3	3	2	3		3	3		3	2		2

3-High, 2- Medium, 1- Low

FSND-204 Practical-I Nutritional Bio chemistry Practical

Course Objectives

- Creating awareness on enzymes and its role in nutrient metabolism.
- Knowledge on role of therapeutic nutrition/diets in person to person metabolism.

PRACTICALS:

1. Estimation of Blood glucose.
2. Estimation of Serum Proteins by Biuret / Reinhold Method
3. Estimation of Serum Triglycerides.
4. Estimation of Serum Cholesterol.
5. Estimation of Serum Iron / kit method
6. Estimation of Haemoglobin
7. Microscopic Examination of Blood Smear for types of blood cells.
8. Estimation of Packed cell volume in the blood.
9. Estimation of Serum Calcium / Urinary Calcium.
10. Estimation of Serum Vitamin C.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Acquire skills in Qualitative and quantitative estimation of metabloites in biological fluids.

CO 2 Know Skills in analysing enzymes and its metabolites.

FSND-205Practical-II Food Microbiology and Safety Practical

Course Objectives

- Acquire knowledge on laboratory techniques to identify microorganisms in food.
- Creating awareness on role and significance of microbial inactivation, adaptation and environmental factors (i.e., aW, pH, temperature) on growth and response of microorganisms in various environments.

PRACTICALS:

1. Simple Staining and Gram's Staining.
2. Media preparations.
3. Total Plate count.
4. Yeast and molds.
5. Isolation techniques.
6. Inoculation of organisms.
7. Testing the type of organisms in fruits and vegetables.
8. Testing the type of organisms in milk and its products.
9. Testing the type of organisms in processed foods.
10. Identification of morphological characters of an organism.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Apply techniques to identify different micro organisms in foods.

CO 2 Compare the role and significance of microbial inactivation, adaptation and environmental factors (i.e., aw, pH, temperature) on growth and response of microorganisms in various environments.

FSND-206 Practical-III Clinical Nutrition and Dietetics-II Practical

Course Objectives

- Comprehensive knowledge in Dietary modifications for the management of diseases.
- Creating Knowledge in preparation and service of diets to these patients.

PRACTICALS:

1. Planning of diets for gastritis, peptic ulcer, diarrhea and constipation.
2. Preparation of diets for peptic ulcer, diarrhea and constipation.
3. Planning of diets for cirrhosis of liver and hepatitis for different age groups.
4. Preparation of diets for cirrhosis of liver and hepatitis for different age groups.
5. Planning of fiber rich and antioxidant rich diets.
6. Preparation of fiber rich and antioxidant rich diets.
7. Planning of diets for hypertension, coronary heart disease (CHD) and myocardial infarction (MI) for different age groups.
8. Preparation of diets for hypertension, coronary heart disease (CHD) and myocardial infarction (MI) for different age groups.
9. Planning of diets for nephritic syndrome, glomerulonephritis and urinary calculi.
10. Preparation of diets for nephritic syndrome, glomerulonephritis and urinary calculi.
11. Planning of low carbohydrate, low fat and high PUFA diets.
12. Preparation of low carbohydrate, low fat and high PUFA diets.
13. Planning of diets for burns patients and post-operative patients.

Preparation of diets for burns patients and post-operative patients.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Skills in Planning and preparation of diets for different disease conditions.

CO 2 Able to know patient Diet service management and counselling.

FSND 207: RESEARCH METHODOLOGY
(Common to all Branches of MSc Home Science and MS Food Technology Course)

COMPULSORY FOUNDATION – THEORY

Course Objectives

This course helps the students to;

1. Get awareness about terms like 'variables','hypothesis' ,research 'andrecognize the purpose of doing a research.
1. Understand different types of research like experimental, survey, applied , action research etc., and differentiate advantages and disadvantages each type of research.
2. Critically apply knowledge to select a sample by using different sampling methods like probability and non-probability sampling .
3. Develop a research proposal in the appropriate scientific style.

UNIT – I : Research Purpose and Types

- Research – Significance, meaning, objectives, Approaches, Research process, Criteria of good research, Variable- types –Types of Research : Historical, descriptive, experimental, case study, survey research, participatory research, Fundamental, applied and action, exploratory research.
- Research hypothesis-Characteristics of good hypothesis.

UNIT –II : Methods of Data Collection and Sampling

- Different Methods and techniques of data collection: Interview, Observation, Social mapping, Participatory assessment Techniques, Data Gathering Instruments, Observation check list, Questionnaire, Interview schedule , Measurement scales.
- Sampling Methods : *Probability sampling* -Simple random, systematic random sampling, two Stages and multi stage sampling, cluster sampling and *Non-probability sampling* - Purposive, quota and volunteer sampling / Snowball Sampling.
- Research Proposal – Preparation.

LEARNING EXPERIENCES

1. Identification of different variables in specialization of study.
2. Framing of hypothesis-Null and alternate Hypothesis
3. Preparation of schedule/questionnaire.
4. Preparation of research proposal
5. Study of an article in a journal-Abstract, Methodology, Results and Bibliography

REFERENCES

1. Kothari, C.R. (2004) :*"Research Methodology (Methods and Techniques)".* New Age International (p) Ltd., New Delhi.
2. Sharma S.R. (1994) *"Statistical methods in Educational Research"*, Anmol Publications Pvt. Ltd., New Delhi.
3. Batnagar, G.L. (1990) :*"Research Methods and Measurements in Behavioural and Social Sciences",* Agri. Cole publishing Academy, New Delhi.
4. BajPai S.M. (1987) *"Methods of Social Survey and Research"*KitabGhat, Kanpur-3
5. Black, T.R. (1999) :*"Doing Quantitative Research in the Social Sciences"*, Sage Publications, New Delhi.
6. Dev Doss R.P. and Kulandavel K (1985) – *"Hand book of methodology of research"* Oxford Press,
7. Garett. (1986) *"Statistics in Psychology and Education"* 10th Indian Re-print Valeits Fefer and Simons Co., Bombay.
8. Goode J.W. and Hatt P.K. *"Methods in Social Science Research"* Mc. Graw hill-Co.
   New York.

Course Outcomes

After studying the course, students will able ;

CO1. Define terms like 'variables', 'hypothesis' ,research'and state the purpose of doing research

CO2. Understand different types of search and can compare the advantages and disadvantages of each type of research

CO3. Critically know the procedures for identifying an ideal sample for scientific research.

CO4. Prepare a research proposal in the appropriate scientific style

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				3								
CO2				3								
CO3				3	2	1			3			1
CO4				3	2	1			3			1

3-High, 2- Medium, 1- Low

FSND208 - HUMAN VALUES AND PROFESSIONAL ETHICS - II
(Revised Syllabus with effect from 2015-16)

ELECTIVE FOUNDATION- THEORY

Course Objectives

This course helps the students to;

1. Associate the terms 'value education' 'self-introspection' and 'self-esteem' which are the core aspirations of all human beings.
2. Understand the importance of ethics in different fields like medical, business , environment and social ethics and ethics of media.
3. Apply the knowledge to assess issues and problems in each profession and correlate the concepts in addressing the ethical issues while choosing and joining a profession.
4. Develop all round and well balanced personality of the students and shapes them to become morally finer, socially responsible and physically fit persons of the society.

Unit-I:

Value Education- Definition - relevance to present day - Concept of Human Values - self introspection – Self-esteem - Family values-Components, structure and responsibilities of family- Neutralization of anger - Adjustability - Threats of family life - Status of women in family and society - Caring for needy and elderly - Time allotment for sharing ideas and concerns.

Unit-II:

Medical ethics- Views of Charaka, Sushruta and Hippocratus on moral responsibility of

medical practitioners. Code of ethics for medical and healthcare professionals. Euthanasia, Ethical obligation to animals, Ethical issues in relation to health care professionals and patients. Social justice in health care, human cloning, problems of abortion. Ethical issues in genetic engineering and Ethical issues raised by new biological technology or knowledge.

Unit-III:

Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions.Characterics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.

Unit-IV:

Environmental ethics- Ethical theory, man and nature- Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population, Justice and environmental health.

Unit-V:

Social ethics- Organ trade.Human trafficking.Human rights violation and social disparities, Feminist ethics.Surrogacy/pregnancy. Ethics of media- Impact of Newspapers, Television, Movies and Internet.

REFERENCES:

1. John S Mackenjie: A manual of ethics.
2. The Ethics of Management" by Larue Tone Hosmer. Richard D. Irwin Inc.
3. "Management Ethics' integrity at work' by Joseph A. Petrick and John F. Quinn. Response Books: New Delhi.
4. "Ethics in Management" by S.A. Sherlekar, Himalaya Publishing House.
5. Harold H. Titus: Ethics for Today
6. Maitra, S.K: Hindu Ethics
7. William Lilly: Introduction to Ethics
8. Sinha: A Manual of Ethics
9. Manu: Manava Dharma Sastra or the Institute of Manu: Comprising the Indian System of Duties: Religious and Civil (ed.) G.C.Halighton.
10. SusrptaSamhita: Tr.KavirajKunjanlal, KunjalalBrishagratha. Chowkarnba Sanskrit series. VolLlI and Ill, Varnasi, Vol I 00,16'20,21-32 and 74-77 only.
11. CarakaSamhita :Tr.Dr. Ram Karan Sarma and VaidyaBhagavan Dash, Chowkambha Sanskrit Series office. Varanasi I, 11.111 VolIPP 183-191.
12. Ethics, Theory and Contemporary Issues. Barbara Mackinnon Wadsworth/Thomson Learning, 2001.

Course Outcomes

After studying the course, students will able ;

CO1. Associate the terms ‘value education’ ‘self-introspection’ and ‘self-esteem’ which are the core aspirations of all human beings.

CO2. Understand the importance of ethics in different fields like medical, business , environment and social ethics and ethics of media.

CO3. Apply the knowledge to assess issues and problems in each profession like medical, business , environment and social ethics and ethics of media and correlate the concepts in addressing the ethical issues while choosing and joining a profession.

CO.4. Apply skills for anger management, care of elderly, environmental protection and thereby develop well balanced personality and will contribute to society as morally finer, socially responsible and physically fit persons

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				2		2			3			
CO2				2		2			3		2	
CO3						2			3		2	
CO4						2			3			

3-High, 2- Medium, 1- Low

SEMESTER-III

Sl. No	Course Code	Components of Study	Title of the Course	No. of Credits	IA Marks	End SEM Exam Marks	Total
1	FSND-301	Core-Theory	Food Processing and Preservation Technology	4	20	80	100
2	FSND-302	Core-Theory	Advanced Human Nutrition	4	20	80	100
3	FSND - 303	Practical-I	Rural Work Experience	4	-	-	100
4	FSND-304	Practical-II	Internship	4	-	-	100
5	FSND- 305	Generic Elective*	(a) Nutrition Research Techniques	4	20	80	100

			(b)Geriatric Nutrition (c)Nutrition in Emergencies and Disaster				
6	FSND- 306	Open Elective **(For other departments)**	(a) Fundamentals of Food, Nutrition and Health (b)Nutritional Assessment	4	20	80	100
		Total		**24**			**600**

***Among the Generic Elective a student shall choose any one.**

FSND 301 : FOOD PROCESSING AND PRESERVATION TECHNOLOGY
(Common to MSc Food Science Nutrition & Dietetics and MS Food Technology Course)

Course Objectives:

- Understand the principles and scope of food processing and preservation.
- Get an overview on various techniques/methods in food processing and preservation.
- Acquire to knowledge of emerging technologies and their applications in food processing and preservation.
- Equip with skills required for process and preserve various food products.

CORE-THEORY

UNIT I: Food processing and preservation – An Introduction

- Need, Purpose and scope-Principles and Methods of food processing and preservation.
- Traditional Methods of food processing and preservation
- Preservatives and Additives - Classification, applications, permissible limits and safety aspects.

UNIT II: Methods of food processing and preservation

- Processing and preservation by Heat - Principles of thermal processing, blanching, pasteurization, UHT processing, thermal sterilization, canning, extrusion.
- Processing and preservation by Cold- Refrigeration and freezing, freezing time and rate, methods of freezing, effect on quality of foods.
- Processing and preservation by Dehydration and concentration – Types, Methods and their suitability for different food products.

UNIT III: Processing and preservation by Fermentation

- Definition, types, Importance, Technology, Benefits and Limitations.
- Processing and preservation of fermented foods -Cereal and pulse products Vegetables, Milk products, Beverages, meat products

UNIT IV: Processing and preservation by Novel methods

Irradiation, high Pressure and ultrasonic, high intensity light, pulse electric field, ohmic heating, inductive heating and pulsed X-rays, Microwave and radio frequency, Minimal Processing, membrane processing, hurdle technology, Nanotechnology and applications in foods.

LEARNING EXPERIENCES

1. Preservation of food by traditional methods using sugar, salt and turmeric powder etc.
2. Preservation by using Chemical preservatives.
3. Preparation of Jams, Jellies, fruit Juices, Squashes, Sauces and bottling – Shelf life study.
4. Pickling with a variety of foods - Shelf life study.
5. Drying and dehydration of foods.
6. Refrigeration, Freezing and freeze drying of foods.
7. Extrusion processing.
8. Processing and preservation of fermented products.

REFERENCE BOOKS & TEXT BOOKS

1. Rama swamy, Hosali. and Marcote,M. (2005).*Food processing- principals and applications*, CRC press, Taylor and Francis group, New York.
2. G.Subbulaxmi and Shobha. A. Udipi (2008), Food processing and Preservation, New age international, New Delhi.
3. Vijayakhader.(2000). *Text book on food storage and preservation*, Kalyani Publishers, New Delhi.
4. Norman, N. Potter, Joseph H. Hotchkiss.(1996). *Food Science*, 5th edition, CBS Publishers &Distributors, New Delhi.
5. Fellows,P. and Ellis,H. (1990). *Food Processing Technology: Principles and Practice,*New York.
6. Harry. W. Von Loesecke.(1998). *Drying and dehydration of Foods*, Allied Scientific,NewDelhi.
7. Jelen,P. (1985). *Introduction to Food Processing*, Prentice Hall, Reston Virginia, USA.
8. Lewis, M.J. (1990). *Physical Properties of Food and Food Processing Systems,* Woodhead, UK.

Course Outcomes:

After the completion of the course, the students will able to –

CO1. Conceptualize principles of traditional and novel food processing and preservation technology.

CO2. Understand the applications and limitations of food processing and preservation technology.

CO3. Comprehend the functions and applications of food preservatives and additives.

CO4. Apply appropriate technologies to process and preserve the foods to extend their shelf life.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3				3							
CO2	3				3							
CO3	3	2			3			3		2		
CO4	3	2		2	3		2					2

3-High, 2- Medium, 1- Low

FSND 302: ADVANCED HUMAN NUTRITION

Course Objectives

- Knowledge on the advance concepts of nutrition of Brain, Immunity and Sports.
- Understand the concepts of dietary management in endemic nutrition problems.
- Creating knowledge on the dietary management during emergencies.
- Comprehensive knowledge in designing of foods in special needs like space, high altitudes and low temperatures.

CORE THEORY

UNIT-I Nutrition, Brain and Behaviour:

- Brain – Structure, composition and functions
- Neurotransmitters- Nutrient precursors of neurotransmitters – Tryptophan, tyrosine, choline and lecithin
- Role of neurotransmitters in Brain function
- Role of Nutrients on Brain growth and development with special reference to protein, zinc, iodine and folic acid

UNIT-II Nutrition and immunity

- Innate immunity – Physical and Chemical barriers, cellular components, humoral components.

- Acquired immunity – cell mediated immunity- Phagocytosis, Cytokinesis, Humoral immunity- B and T Cells maturation.
- Role of nutrients in immunity
- Effect of malnutrition on immunity

UNIT-III Endemic nutrition problems and their management

- Flurosis – Aetiology, prevalence, symptoms and nutritional management
- Iodine deficiency disorders - Aetiology, prevalence, symptoms and nutritional management
- Osteoporosis - Aetiology, prevalence, symptoms and nutritional management

UNIT-IV Principles of Nutrition and management systems in Emergencies –

- Droughts, Famines, Floods – Disaster management system
- Assessment of food needs in emergency situations
- Food distribution strategy – Identifying and reaching the vulnerable group – Targeting Food Aid.
- Mass and Supplementary Feeding / Special foods/rations for nutritional relief
- Household food security and nutrition in emergencies

Special needs

- High altitudes and Low temperatures ,Space nutrition.

REFERENCE BOOKS:

1. Whitney and Sharon Rady Rolfes. (1999). Understanding Nutrition" (8th edition) An International Thomson Publishing Company, Albnay, New York, USA, Wadsworth Publishing Company.
2. M.S. Bamiji, N. Prahlad Rao and Vinodini Reddy . (1998). Text Book of Human Nutrition" Oxford and IBFI Publishing Co. Pvt. Ltd., New Delhi.
3. Heather Hedrick Fink, Alan E. mike sky. (2012). Practical Applications in Sports Nutrition, Third Edition, Library of Congress Cataloging in Publication Data. United States of America.
4. Michelle McGuire, Kathy A Beer man. (2011). Nutritional sciences From Fundamental to Food, Second Edition, Wadsworth Cengage Learning, Belmont, USA.
5. C. Gopalan, B.V. Ramasastri and S.C. BalaSubramanian. (2012). Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council Medical Research Hyderbad.
6. Nutrient Requirements and Recommended Dietary Allowance for Indians A Report of The Expert Group of ICMR. 2010.
7. Dr. M. Swami Nathan. (2010). Food and Nutrition Volume-2 Second Edition the Bangalore Printing and Publishing Co Ltd Bangalore 560018.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Acquire knowledge on advanced nutrition concepts and management

CO 2 Demonstrate and apply the concepts and designing foods for brain, immunity and sports.

CO 3 Skills to manage the diet in emergency situations.
CO 4 Present knowledge on designing foods for special needs.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3					2			2		2
CO2	3	3		3			2			2		2
CO3	3	3	3	3		2						2
CO4	3	3	3	3		3						2

3-High, 2- Medium, 1- Low

FSND 303: Practical I -Rural work Experience

Course Objectives

The Rural work experience helps the students:

1. To expose students to the natural setting of the village situations, to understand the rural life by students.
2. To develop an understanding of rural life situations prevailing in villages with special reference to Home science among the students.
3. To familiarize with the socioeconomic conditions of people and their problems and several agencies and institutions involved in rural development.
4. To develop communication skills in students using extension teaching methods in the transfer of technology.
5. To develop confidence and competence to solve the problems.
6. To acquaint students with on-going extension and rural development programmes.
7. To impart diagnostic and remedial knowledge to the students relevant to real field situations through practical training.
8. To improve the overall nutritional status of rural communities by identifying the problems related to health and nutrition.

9. To impart the knowledge and skills in the fields like Food and nutrition, Human development, Textiles and clothing, Human resource management, can be provided to the needy families.
10. To develop leadership among people and help them in organizing groups to solve their problems.

The Rural Work Experience (RWE) is a compulsory course offered in IIIrd Semester M.Sc. students primarily to understand the rural situations, prioritize the rural problems and to develop skills & attitude of working with rural people for all-round development in rural areas. This programme develops competency in the areas of technological, managerial and communication skills among the students. To develop communications skills in students using extension training methods through planning, preparing of Teaching Learning materials and providing education in the areas of Nutrition, Child development and transfer of technology.

Specific survey schedules are used for collection of general information, assessment of nutritional status of members of each household, measurement of developmental aspects and anthropometric data of children. After analysis of the collected data, needs of the people will be identified. Based on the felt needs, combination of methods of extension for effective dissemination of information will be planned, with the help of local leaders, students will stay in the village for 10-15 days and through participatory approach the action projects will be organized, lecturing, demonstrations, organization of exhibitions, dissemination of messages through role play, skits etc. are some of the techniques used. From the starting of the programme ,the total programme is monitored and evaluated meticulously by the staff of the Department.

The Rural Work Experience Programme, is mandatory for M Sc. Home Science Students.

Course outcomes

After completion of the RWE programme, students will be able to;

CO 1 Understand and experience the rural life; their socio-economic conditions; problems of rural people; agencies involved in rural development

CO 2 Develop communicative skills, confidence, and competence, to solve the problems related to women, children and youth in the rural areas; use extension teaching methods in the transfer of technologies to the rural families; develop leadership among people and help them in organizing groups to solve their problems; improve the standard of living of the rural people.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2					3	3	2	2		1
CO2	3	2					3	3	2	2		1

H-High, M- Medium, L- Low

FSND 304 -Practical-II- INTERNSHIP-Dietitian in Hospitals.

INTERNSHIP as dietitian in hospitals give practitioner skills for entry-level dietitians who are able to assume leadership roles to improve and maintain the nutritional care of diverse individuals, families and communities within national and global populations.

Course Objectives

- Able to prepare students to be competent as entry-level dietitians.
- Acquire knowledge in assessing and counseling patients in situations.
- Gain skills in planning and preparing therapeutic diets for different patients.
- Prepare graduates to be leaders and to participate in community service.

The students will undergo training for six weeks in minimum 100 bedded Hospitals with food service. After completion the students submit a detailed report of the case studies and present a seminar. An evaluation report for 100 marks along with a certificate of internship is issued by the hospital. A copy of the certificate is enclosed along with report.

Course outcomes

CO 1 Prepare students as Dietitians

CO 2 Assess and counsel patients

CO 3 Apply Skills in planning and preparing diets for patients according to needs.

CO 4 Counsel communities in nutrition education.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2							3	3		3
CO2	3	2							3	3		3
CO3	3	3	3	3	3				3	3		3
CO4	3	3				3	3		3	3		3

3-High, 2- Medium, 1- Low

FSND 305 A: NUTRITION RESEARCH TECHNIQUES

Course Objectives

- Understand the methods of nutritional status assessment.
- Knowledge on assessment techniques of protein quality in diets
- Comprehensive knowledge on research techniques using animal models.
- Gain knowledge in nutrition research techniques using Human models.

GENERAL ELECTIVE- THEORY

UNIT-I

Assessments of Nutritional status:

Direct methods-Anthropometric, Biochemical, Clinical, Dietary assessments.

- Anthropometric assessment: Introduction, Definition, Methods of measurements, Standardizations Classification of Nutritional status.
- Biochemical assessment: Need for Biochemical test, Interpretation of biochemical test, Types of test.
- Clinical assessments: Assessment of clinical signs in various disorders.
- Dietary Assessments: Types of Diet surveys, methods of Diet surveys, analysis and interpretation, problems in Diet surveys and solutions.

Indirect method: Vital statistics and other Records

UNIT II

Methods of estimation of protein quality:
Protein efficiency ratio (PER), Digestibility co efficient, Biological value (BV), Net Protein Utilization (NPU), Net protein Ratio (NPR), Chemical score, protein Digestibility corrected Amino Acid Score (PDCAAS), Net Dietary Protein Calories Percent (NDPCP).

UNIT III

Growth studies: animal models:

- Role of animal models in nutrition research; need for extrapolation of animal research results to human populations; Maintenance of animal laboratory; maintenance of records; Principles of formulation of diets- classification and composition.
- Growth and development of rats- role of different protein levels of the diet protein sources of the diet- body weight changes- feeding techniques- calculation of PER.
- Biological Assays with animal models: metabolic and balance studies: (for protein quality): Biological value- formulation of objectives, composition of diets- collections of urine and fecal, food intake assessment, determination of food and urine and fecal nitrogen – calculations of endogenous nitrogen – digestibility co-efficient (DC) and Biological value (BV).

UNIT IV

Growth and metabolic studies with Human subjects:

- Principles, objectives.
- Growth studies with infants on feeding different protein sources. (case study experiences and report of research studies)
- Growth studies with preschool children, school children and adolescents: Effect of supplementation
- Nitrogen balance studies, in growing children, adolescents and adults- Procedure for conducting metabolic and balance studies and interpretation of results.

REFERENCE BOOKS

1. Mahatab.S. Bamiji, N. Prahlad Rao and Vinodini Reddy . (1998). Text Book of Human Nutrition" Oxford and IBFI Publishing Co. Pvt. Ltd., New Delhi.
2. Swaminathan M. (1995).Advanced Text book on "Food and Nutrition" (Applied aspects) Vol. II BAPPCO, The Bangalore Printing and Publishing Co. Ltd., (Chapters 21, 24) Bangalore.
3. Tara Gopaldas and SubhadraSeshadri. (1997). Nutrition, Monitoring and assessment, Oxford University Press, New Delhi .
4. Whitney. E.N, and S.R.Rolfes. (1999). `Understanding Nutrition', (8th edition) Chap. 6 and Appendix `J'.Measures of Protein Quality - West/Wadsworth.
5. Ruth .L. Pyke and Myrtle .L. Brown. (1997). Nutrition an Integrated approach, Chapter 15, Wiley eastern Publications, New Yark.
6. Manual (WHO) Measuring Change in Nutritional Status. WHO, Geneva - 1983.
7. Mayanard, L.A and J.K. Loosli. (1992). Animal Nutrition, 5th edition McGraw Hill book company, New York

Course Outcome

Upon completion of this course, students will be able to

CO 1 Assess nutritional status using ABCD techniques.

CO 2 Apply advance research techniques in dietary assessment.
CO 3 Do nutrition research using animal models.
CO 4 Design nutrition research using human models.

CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3			3	2		2					3
CO2	3			3	2		2					3
CO3	3			3			2					3
CO4	3			3			2					3

3-High, 2- Medium, 1- Low

FSND 305 B: GERIATRIC NUTRITION

Course Objectives

- Understand the physiological changes and theories of ageing.
- Knowledge on importance and consequences of diet in elderly.
- Awareness on degenerative diseases, life style genesis and its management through diet.
- Describe the government programs and policies for elderly.

GENERAL ELECTIVE- THEORY

UNIT-I: The process of Ageing – Physiological biochemical and body compositional changes – Theories of ageing. Socio-cultural and psychological aspects of ageing – Health seeking behaviour of the elderly.

UNIT-II: Food and Nutritional needs of the elderly – Dietary management – Special problem of women – menopausal, post-menopausal. Problems; Early nutrition and nutrition and health in later years.

UNIT-III: Chronic degenerative diseases and nutrition and health problems of the elderly – their etiology – genesis life style and living condition, management, prevention and control.

UNIT-IV: Policies and programmes of the government and NGO sectors pertaining to the elderly – old age homes – Day care and recreation centers – their need and scope.

REFERENCE:

1. Sharma, O.P. (Ed.) (1999): Geriatric Care in India – Geriatrics and Gerontology: A Textbook, M/S. ANB Publishers.
2. Mahtabs.Bamji and N.PralhadRao . (2004). Text book of Human Nutrition, Second Edition, Oxford and IBH Publishing co. PVT LTD. New Delhi.
3. Heather Hedrick Fink, Alan E. mike sky. (2012). Practical Applications in Sports Nutrition, Third Edition, Library of Congress Cataloging in Publication Data. United States of America.
4. Michelle McGuire, Kathy A Beer man. (2011). Nutritional sciences From Fundamental to Food, Second Edition, Wadsworth Cengage Learning, Belmont, USA.
5. Swami Nathan M. (2010). Food and Nutrition Volume-2 Second Edition the Bangalore Printing and Publishing Co Ltd Bangalore 560018.
6. Shubhangini A. Joshi. (2010). Nutrition and Dietetics Third Edition Tata Mecgraw Hill Education Private Limited New Delhi.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Acquire knowledge on process of ageing
CO 2 Plan diet according to recommendations for elder people.
CO 3 Describe diet plans for different disease conditions in elder people.
CO 4 Ilustrate the available government benefits for elder people.
CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3										
CO2	3	3							2	2		
CO3	3	3	2			2			2	2		
CO4						3						2

3-High, 2- Medium, 1- Low

FSND305 C : NUTRITION IN EMERGENCIES AND DISASTERS
(Common to M.Sc Food Science Nutrition & Dietetics and MS Food Technology Course)

Course Objectives

- Understand the emergency situations in natural and manmade disasters.
- Gain knowledge on nutrition surveillance and treatment in emergencies.
- Knowledge on planning nutrition relief and rehabilitation in emergencies.
- Concepts on Epidemiology and its application in planning programs during emergencies.

GENERAL ELECTIVE- THEORY

UNIT-I

- Natural/Manmade disasters resulting in emergency situations:
  - Famine, drought, flood, earthquake, cyclone, war, civil and political emergencies.
  - Factors giving rise to emergency situation in these disasters.
  - Illustration using case studies from Indian subcontinent
- Nutritional problems in emergencies in vulnerable groups
  - Causes of malnutrition in emergency situations
  - Major deficiency diseases in emergencies
  - Protein – Energy Malnutrition / Starvation / Under Nutrition.
  - Specific Nutrient deficiencies - Energy, Vitamins, Minerals
- Communicable disease: Surveillance and treatment.
  - Control of communicable diseases in emergencies – Role of immunization and sanitation.

UNIT-II

Assessment and surveillance of Nutritional status in emergency affected populations.

- Scope of assessment of malnutrition in emergencies
- Indicators of malnutrition. Clinical signs for screening acute malnutrition
- Anthropometric assessment of nutritional status. Indicators and cut-offs indicating
- seriously abnormal nutrition situation: Weight for height based indices, MUAC,
- social indicators.
- Organization of nutritional surveillance and individual screening.

UNIT-III

- Nutritional Relief and Rehabilitation
  - Assessment of food needs in emergency situations
  - Food distribution strategy – Identifying and reaching the vulnerable group – Targeting Food Aid.
  - Mass and Supplementary Feeding
  - Therapeutic Feeding
  - Special foods/rations for nutritional relief
  - Local production of special foods
  - Local foods in rehabilitation
  - Organisation of mass feeding/general food distribution
  - Feeding centers
  - Transportation and food storage

- Sanitation and hygiene,
- Evaluation of feeding programmes
- Household food security and nutrition in emergencies

- Public nutrition approach to tackle nutritional problems in emergencies

UNIT-IV

- Introduction to Epidemiology – types of epidemiology, collection of epidemiological data, secondary routine date, Desciptive epidemiology, Cross sectional Analysis, prevalence and incidence, risk factors, risks and odds, relative and attributable risks
- Principles of Nutritional Epidemiology, Measurement issues, Measurement of disease, Occurrence and Measurment of association, Exposure and outcome, Socio demographic and Psycho social variables.
- Design and Planning of Nutritional Epidemiological studies – assessing and supplyingAndEvaluating Epidemiological studies – Discussion of selected case studies

REFERENCE:

1. World Disasters Report – Focus on Public Health, International Federation of Red Cross and Red Crescent Societies.
2. Disasters – International Public Nutrition and Emergencies: The Potential for improving practice. Special Issue – Vol.23/4, Dec. 1999.
3. Guidelines and Research publications of OXFAM, WFP, Rome. 1999.
4. Nutrient Requirements and Recommended Dietary Allowance for Indians A Report of the Expert Group of ICMR. 2010.
5. Dr.M Swami Nathan. (2010). Food and Nutrition Volume-2 Second Edition the Bangalore Printing and Publishing Co Ltd Bangalore 560018.
6. Shubhangini A.Joshi. (2010). Nutrition and Dietetics Third Edition Tata Mecgraw Hill Education Private Limited New Delhi.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Acquire knowledge in nutritional problems in natural and man made disasters.

CO 2 Assess the nutritional status in emergency and plan surveillance and treatment to the affected.

CO 3 Acquire knowledge on nutrition epidemiology.

CO 4 Plan and Execute nutrition rehabilitation in emergencies.

CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3								3	3	3	3
CO2	3	2		2					3	3	3	3
CO3	3		2	2			2	2				3
CO4	3		3			2			3			3

3-High, 2- Medium, 1- Low

FSND 306 A: FUNDAMENTALS OF FOOD, NUTRITION AND HEALTH

OPEN ELECTIVE- THEORY

Course Objectives

- Knowledge on foods, food groups, balanced diet for different age groups.
- Understand the importance of macro and micronutrients in daily diet.
- Comprehensive knowledge on deficiency symptoms of different nutrients.
- Able to get knowledge on nutritional problems in community.

UNIT-I: Food Composition

- Food groups – Classification – food composition and nutritive values of different foods, Functions of foods. Balanced Diet, RDA for all age groups.

UNIT-II : Macronutrients

- Carbohydrates: Definition, classification, food sources, Function in human body, Recommended Daily Allowance (RDA) and importance of fibre.
- Fats and Oils: Definition, classification, saturated and unsaturated fatty acids, cholesterol, Food sources, requirements, RDA and biological functions.
- Protein: Definition, classification, essential and non-essential amino acids, protein quality, supplementary value of protein, food sources, RDA and functions.

UNIT-III : Micronutrients

- Vitamins: Definition, classification
- Fat soluble Vitamins (A, D, E, K) - Functions, sources, RDA, Deficiency diseases and symptoms.
- Water soluble Vitamins (B complex and C): Functions, sources, RDA, Deficiency diseases and its symptoms.
- Macro minerals: Calcium, phosphorous, sodium, potassium, chloride- sources, biological functions, factors affecting availability, Deficiency diseases and symptoms.
- Micro minerals: Copper, zinc, Iron, Iodine and fluorine in human nutrition, biological functions, factors affecting availability, Deficiency diseases and symptoms.

Unit - IV: Major Nutritional Problems of the Community:

- Malnutrition - PCM, obesity, micronutrient malnutrition, government programmes to eradicate PCM, vitamin-A, iron and iodine deficiencies, principles of planning diets for different conditions of malnutrition.

REFERENCES BOOKS

1. Swaminathan, M. (1999). Essentials of Food and Nutrition, Vol. I and Vol. II Ganesh and co. Madras.

2. Mahtabs. Bamji and N.Pralhad Rao. (2004). "Text book of Human Nutrition, Second Edition, Oxford and IBH Publishing co. PVT LTD. New Delhi,

3. C.Gopalan, B.V.RamasastriandS.C.BalaSubramanian.(2012). Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council Medical Research Hyderbad.

4. Nutrient Requirements and Recommended Dietary Allowance for Indians A Report of the Expert Group of Indian Council Medical Research.2010.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Acquire knowledge on food groups and functions of food.
CO 2 Gain knowledge on importance of macro and micronutrients in different age groups.
CO 3 Identify signs and symptoms of different nutrient deficiencies.
CO 4 Illustrate the nutritional problems in community.

CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		3								2
CO2	3	3		3								2
CO3	3	3		3								2
CO4	3	3		3			3	2	2	2		2

3-High, 2- Medium, 1- Low

FSND 306 B: NUTRITIONAL ASSESSEMENT
OPEN ELECTIVE- THEORY

Course Objectives

- Learn the determinants of Nutritional Surveillance.
- Understand the direct and indirect methods of nutritional assessment.
- Knowledge on dietary assessment at individual and house hold level.
- Identify the clinical symptoms and biochemical tests for different nutritional problems.

UNIT-I

- Nutritional Surveillance: Need determinants, Nutritional Surveillance over view of the methods of assessment of Nutritional and health status.

UNIT-II

- Methods of assessment: Direct and Indirect methods of Nutritional assessment of human groups-ABCD- Techniques.
- Assessment of age: Using local events calendar
- Anthropometry Assessment: Measurement used, use of equipment, standards for comparison. Classification used to categorize malnutrition, cut of points used to distinguish current and long term malnutrition.
- Indicators of nutritional status
- Guidelines for interpretations of growth charts.

UNIT-III

- Dietary assessment: Methods and techniques for assessing dietary intakes of individual, house hold level and institutional level.

UNIT-IV

- Clinical assessment: Study of different methods and techniques for clinical assessment of nutritional status and diagnosis of sign of relation to various nutrient deficiencies.
- Biochemical assessment: Methods and techniques for major nutritional disorders, standards for comparison, field level assessment techniques.

REFERENCES BOOKS

1. Mehtab S. Bamji. (1996). Text book of Human Nutrition, Oxford& IBH Co.PVT.LTD, New Delhi.
2. Swaminathan, M. (1999). Essentials of Food and Nutrition, Vol. I and Vol. II Ganesh and co. Madras.
3. Mahtabs. Bamji and N.Pralhad Rao. (2004). "Text book of Human Nutrition, Second Edition, Oxford and IBH Publishing co. PVT LTD. New Delhi,
4. C.Gopalan, B.V.RamasastriandS.C.BalaSubramanian.(2012). Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council Medical Research Hyderbad.

Course Out comes

Upon completion of this course, students will be able to

CO 1 Acquire knowledge on Nutritional Surveillance.
CO 2 Apply direct and indirect techniques to assess nutritional status.
CO 3 Gain knowledge on methods of dietary assessment at individual and house hold level.
CO 4 Identify signs and symptoms of different nutrient deficiencies.

CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3		2				2		3	3	3	3
CO2	3	2		3			2					
CO3	3	2		3			2					
CO4	3			3			2					

3-High, 2- Medium, 1- Low

SEMESTER-IV

Sl. No	Course Code	Components of Study	Title of the Course	No. of Credits	IA Marks	End SEM Exam Marks	Total
1	FSND-401	Core-Theory	Food Safety Standards and Quality Control	4	20	80	100
2	FSND-402	Core-Theory	Food Product Development and Marketing	4	20	80	100
3	FSND-403	Core-Theory/ Project work	Nutrition for Health and Fitness/Dissertation	4	20	80	100
4	FSND-404	Core-Practical	Food Safety Standards and Product Development Practical's	4	-	-	100
5	FSND-405	Generic Elective*	(a) Institutional Food Service Management (b) Baking Technology (c)Food Packaging	4	20	80	100
6	FSND-406	Open Elective* **(For other departments)**	(a) Child Welfare Programmes (b)Disaster Management	4	20	80	100
		Total		**24**			**600**

***Among the Generic Elective a student shall choose any one.**

SEMESTER - IV

FSND 401 : FOOD SAFETY STANDARDS AND QUALITY CONTROL
(Common to M.Sc Food Science Nutrition & Dietetics and MS Food Technology Course)

Course Objectives

- Understand the current food safety standards rules and regulations.
- Knowledge on desirable and undesirable constituents and contaminants in foods.
- Gain knowledge on subjective and objective methods.
- Learn the methods of contaminants in food for quality assurance.

CORE THEORY

UNIT-I- Food Quality, Assessment and evaluation.

- Definition and Physico Chemical attributes.
- Sensory perception; subjective/ organoleptic evaluation.
- Objective methods of evaluation.
- Chemical methods of evaluation.
- Microbial methods of evaluation.

UNIT-II - Food safety : Food Safety Standards Authority of India (FSSAI)

- Current rules and regulations
- Definitions of standards of identity and quality
- Food licensing and registration system
- International food safety measures

UNIT-III- Food safety

- Definitions
- Undesirable constituents-Naturally occurring contaminants.Heavy metals, pesticide residues,products of microbial growth etc .,Health hazarads.
- Desirable constituents-chelating agents,acids,bases,buffer systems and salts; stabilizers,thickners,polyhydrocalcinols,anticaking,firming,clarifyingand bleaching agents; antioxidants, non- nutritional sweeteness, antimicrobial agents.
- Gases and propellants.

UNIT IV -Food contaminants and Standards of Quality-

- Contaminants in milk and milk products
- Contaminants in fruit and vegetable products
- Contaminants in meat, poultry, eggs and fish
- Contaminants in fats and oils
- Contaminants in spices and condiments.
- Contaminants in Water and Beverages.
- Contaminants in Food grains and flours
- Contaminants in sugar

REFERENCES:

1. Vanisha Nambiar. (2004). A Text book on "Food Contamination and Safety " ANMOL Publications Pvt.Ltd. New Delhi .
2. S.N.Mahindru . (2004). Food Safety –Concept and Reality,APH Publishing corporation, Ansari road ,Darya ganj, New Delhi.
3. Rajesh Mehta and J.George . (2005). Food Safety Regulation concerns and Trade –The developing country perspective ,Mac millan India Ltd.
4. Amerine, M.A., Pangborrn RM, and Roessler BB. (1965). Principles of Sensory evaluation of foods", Academic press New York.
5. The prevention of food adulteration Act, 1954 and Prevention of food adulteration Rules, 1955. (1998). Federation of Indian Industry, New Delhi.
6. Norman N. Potter, Joseph H. Hotchkiss (1996) "Food Science" 5th Edition.CBS Publishers and Distributors, New Delhi.
7. https://www.fssai.gov.in

Course Outcomes

Upon completion of this course, students will be able to

CO1 Gain knowledge in current rules and regulations of food safety standards and quality assurance.
CO 2 Identify the contaminants and additives in foods.
CO 3 Select the appropriate analytical technique when presented with a problem.
CO 4 Demonstrate practical proficiency in a food quality analysis.
CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3						3				3
CO2	3	3						3				3
CO3	3	2		1	3	1		3				3
CO4	3	2		1	3	1		3				3

3-High, 2- Medium, 1- Low

FSND- 402: FOOD PRODUCT DEVELOPMENT AND MARKETING

(Common to M.Sc Food Science Nutrition & Dietetics and MS Food Technology Course)

CORE-THEORY

Course Objectives:

- Illustrate the new product categories in food market and their characteristics.
- Elucidate the process of new food product development in food industry.
- Exemplify various speciality food products and their applications.
- Acquire the skill to design and development of new food product and analyse the quality of the product.

UNIT I:

New Food Products

- New food product: Definition- Introduction-Need for New food product development.
- Classification: Line extensions - Repositioning of existing products - New form of existing product - Reformulation - New packaging - Innovative products - Creative products and Value added products

UNIT II:

New Food product development Process - Stages/Phases.

- Ideation: Idea generation- Screening-Feasibility studies.
- Consumer research.
- Product design and Formulation.
- Process development – Prototype development and scale up.
- Quality assessment of new developed products -Sensory Evaluation-Shelf life - Testing- Packaging and labeling protocols.
- Product life cycle.

UNIT III:

Speciality food products

- Health foods-Medical foods-Therapeutic foods-Herbal foods-Fortified foods.
- Infant foods- Geriatric foods-Sports drinks.
- Functional foods- Designer foods and Neutraceuticals.
- Prebiotics and probiotics.

UNIT IV:

Product Commercialization and Marketing

- Entrepreneurship – Financial review, Costing and Pricing, Test Market, Product launching and Commercialization.
- Ethics in food product development.
- Intellectual property/ Patents.

REFERENCES

1. Fuller, G.W.(1994).*New Food Product Development: From Concept to Market place*, CRC, Press, New York.
2. Graf, E. and Saguy, I.S. (1991).*Food Product Development: From Concept to the Market Place*, Van Nostrand Reinhold New York.
3. Andrew, J.Taylor.(2002). *Food Flavour Technology*, Sheffield Academic Press.
4. Debashri, Ray.(2002). *Nutritional Challenge and Total Quality Management*, 1st edition;Sarup and Sons, New Delhi.
5. Oickle, J.G. (1990).*New Product Development and Value Added*, Food Development Division Agriculture, Canada.
6. Proc. Food Processors Institute: A key to Sharpening your Competitive Edge. Food Processors Institute, Washington, DC.

Course Outcomes

After the completion of the course, the students will able to –

CO1.Apply a product development process to generate ideas, develop concept to test market.
CO2.Design food and nutritional label of food products.
CO3.Demonstrate the skills to conduct the organoleptic evaluation of food product.
CO4.Work collaboratively with a team in food product development

CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3		3	2	2				
CO2	3	3	3	3								
CO3	3				3							2
CO4	3								2			2

3-High, 2- Medium, 1- Low

FSND 403: NUTRITION FOR HEALTH AND FITNESS

(Common to M.Sc Food Science Nutrition & Dietetics and MS Food Technology Course)

Course Objectives

- Define the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation.
- Understand the Energy metabolism pathways during physical activity.
- Describe the role of macronutrients in physical performance, weight management and obesity.
- Understand the nutritional needs in different sports and the role of national agencies.

CORE THEORY

UNIT-I

Definitions- Nutrition, Health, Physical activity, Physical Fitness Benefits of exercise on Health and fitness, Physical activity Recommendations, components of physical fitness, Assessment criteria of age specific fitness and health status- Evaluation of physical fitness- FITT Principles**.**

UNIT-II

Energy metabolism in physical activity- Aerobic and Anaerobic metabolic pathways, energy requirements and assessment of energy expenditure based on physical activity.

UNIT-III

Nutritional and physical performance- carbohydrate, fat, protein and exercise, vitamins, minerals and fluid needs during exercise, nutrition in post exercise recovery. Special conditions- weight management and obesity.

UNIT-IV

Sports nutrition, classification of sports events, RDA for sports person, Nutritional requirements and special needs of sports person, pre, during , post sports events, water and electrolyte balance, ergogenic aids, Endurance and fatigue in sports performance- Assessment-strategies, Role of National agencies towards improvements of sports performance

REFERENCES:

1. Shils, M.E., Olson, J.A., Shike, N. and Ross, A.C.(Ed)(1999). Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
2. Whitney, E.N. and Rolfes, S.R.(1999). Understanding Nutrition, 8th Edition, West/Wadsworth, An International Thomson Publishing Co.
3. McArdle, W.Katch, F. and Katch, V. (1996). Exercise Physiology, Energy, Nutrition and Human Performance, 4th edition, Williams and Wilkins, Philadelphia.
4. Ira Wolinsky(ed) (1998). Nutrition in Exercise and Sports, 3rd Edition, CRC Press.
5. Mahtabs.Bamji and N.Pralhad Rao. (2004).Text book of Human Nutrition, Second Edition, Oxford and IBH Publishing co. PVT LTD. New Delhi.
6. Heather Hedrick Fink, Alan E. mike sky. (2012). Practical Applications in Sports Nutrition, Third Edition, Library of Congress Cataloging in Publication Data. United States of America.
7. Michelle McGuire, Kathy A Beer Man. (2011). Nutritional sciences From Fundamental to Food, Second Edition, Wadsworth Cengage Learning, Belmont, USA

Course Outcomes

Upon completion of this course, students will be able to

CO 1 Gain knowledge on concepts of physical activity and physical fitness.
CO 2 Describe the energy metabolism pathways in physical activity.
CO 3 List the role of macronutrients in physical performance.
CO 4 Demonstrate the importance of nutrients in Sports.

CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										2
CO2	3	2										1
CO3	3		3									1
CO4	3			2	2							2

3-High, 2- Medium, 1- Low

FSND-404 Core-Practical Food Safety Standards and Product Development Practical's

Course Objectives

- Gain knowledge on subjective and objective methods.
- Learn the methods of contaminants in food for quality assurance.

PRACTICALS:
Assessment of quality parameters in different foods

1. Survey of different foods in market
2. Cereals and pulses – label information, adulterants
3. Fats and oils – saturation , Rancidity
4. Fruit and vegetable products – Maturity , acidity , TSS, sugars
5. Coffee and tea , spices , Honey – Adulterants
6. Milk and milk products
7. Meat products
8. Determination of different preservatives
9. Determination of different colors
10. Document preparation for the approval of FSSAI

Course Outcomes
Upon completion of this course, students will be able to

CO 1 Select the appropriate analytical technique when presented with a problem.
CO 2 Demonstrate practical proficiency in a food quality analysis.

FOOD PRODUCT DEVELOPMENT

Course Objectives:

- Exemplify various speciality food products and their applications.
- Acquire the skill to design and development of new food product and analyse the quality of the product.

PRACTICALS

1. Market Survey to identify new products in terms of
   - Line Extension, Repositioning of Existing Products, New form, Reformulation, New packaging, Innovative products and Creative Products.
2. Market Survey to identify
   - Nutrition products, Therapeutic products, Specialty products, Technology Driven products.
3. New Food Product Development.
   - Ideation.

- Formulation,
- Standarzation,
- Acceptability studies.
- Shelflife Studies.
- Costing and Pricing.
- Food and Nutrition labeling and packaging
- Test Marketing

Course Outcomes

After the completion of the course, the students will able to –

CO1.Demonstrate the skills to conduct the organoleptic evaluation of food product.
CO2.Work collaboratively with a team in food product development

FSND 405 A: INSTITUTIONAL FOOD SERVICE MANAGEMENT
(Common to M.Sc. Food Science Nutrition & Dietetics and MS Food Technology Course)

Course Objectives

- Understand the different types and management of food services.
- Illustrate the infra structure plans, menus and equipment in food service establishments.
- Know the food safety measures in food service establishments.
- Knowledge on finance and personnel management.

GENERAL ELECTIVE- THEORY

UNIT-I: Introduction to food service Industry, management and types of Food service establishments.

- Principles and functions of food service management.
- Need and importance
- Tools of Management.
- Management of resources.
- Types: Hotels and Restaurants - Hotels/Motels, restaurants,cafes, clubs public, houses, winebars, speciality restaurants, fast foods, take-aways,street foods.
- Welfare and Industrial - Residential establishments - School, colleges, hostels, old people House, Hospitals, nursing homes, Industrial canteens, Temple feeding and Marriage feeding.
- Transport - Railway, Airlines and Sea.

UNIT-II: Infrastructure and Equipment in Food Institutions

- Building plans, outlays of work places - kitchen spaces, storage spaces and service areas.
- Equipment - Classification of equipment, selection of equipment, Design, installation, operation and maintenance.
- Menu – types of menu in Food service institutions, principles and planning
- Food service operation and types of food services - systems of service, mechanics of waiter service, self-service, vending and mobile catering.
- Food services systems - Introduction, Standards of hygiene.
- Cook-chill system and benefits.
- Cook-freeze system and benefits.
- sous-vide.
- Computers in service - Introduction, catering controls.

UNIT-III: Food safety in public catering.

- Health and Hygiene of personnel.
- Laws governing food service in public catering.
- Sanitation of food service establishments.
- Food safety in hotels, restaurants, street foods, industry and canteens, hospitals, hostels, airlines , railways, temple and mass feeding programmes.

- Laboratory support services in food safety.
- Food borne diseases and importance of surveillance
- Food safety awareness programmes to food handlers and consumers.
- Role of media in food safety education.

UNIT IV: Financial and Personnel Management

- Definition and scope of financial management.
- Cost concept, cost control and pricing.
- Book keeping and accounting.
- Personnel Management - Recruitment, selection and Induction, Job analysis, description Monitoring work employee facilities and benefits, Inservice Training. Skills required to operate and manage food service system.

REFERENCES

1. 1. Ronald Kinton and victor cesarani (1992),"The theory of catering", Butler and Tanner Ltd. France and London.
2. Mohinisethi and Surjeet Mohan (1993), "Catering management - An integrated approach", second edition, Wiley easteem limited, New Delhi.
3. Ramesh V. Bhat and R. Nageswara Rao (1996), "Food safety", Bappco (Ltd). Mysore, Banglore.
4. Ramesh V. Bhat and R. Nageswar Rao (1992), "Food safety in public catering", NIN, ICMR, Hyderabad.

Course Outcomes

Upon completion of this course, students will be able to

CO 1 Gain knowledge in management of food service establishments.
CO 2 Describe the infrastructure plan, menus and equipment used in food service establishments.
CO 3 Take food safety measures in food service establishments..
CO 4 Apply skills in finance and personnel management.

CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3			3							3	3
CO2	3			3							3	2
CO3						3			3		3	2
CO4						3			3		3	2

3-High, 2- Medium, 1- Low

FSND 405-B: BAKING TECHNOLOGY

(Common to MSc Food Science Nutrition & Dietetics and MS Food Technology Course)

Course Objectives: To enable the students to:

1. Understand the concept and technology of baking.
2. Learn the role of different ingredients in baking process
3. Familiarize with processing techniques of various bakery products
4. Develop skills in organizing and maintenance of a baking industry.

GENERIC ELECTIVE - THEORY

UNIT-I: Bakery Industry

- Introduction, current status, growth rate, and economic importance of Bakery Industry in India.
- Baking: Principles, baked foods, Baking temperatures, Knowledge and working of various types of oven, baking equipment; Roasting: Principles of roasting, roasting equipment;
- Formulations, processing (mixing, fermentation, rounding, proofing, sheeting, moulding, baking, depanning etc.), equipments, packaging, storage and quality testing of bakery products

UNIT-II: Baking Technology

- Types and grades of wheat flour, Wheat flour proteins and importance of gluten in manufacture of bakery products.
- Role of ingredients in bakery products- sugars, fats, leavening agents, additives and other ingredients.
- Types of Bakery Products and Technology for their Manufacture – dough and batters; Dough rheology.

UNIT-III: Bakery Products

- Hard wheat Products: bread- Ingredients, various types of bread, equipments and types of mixing methods, preparation of bread, Product quality characteristics, faults and corrective measures of bread.
- Soft wheat Products: cookies, crackers, biscuits– Ingredients, types, equipments, method of preparation, Product quality characteristics, faults and corrective measures.
- Ingredient used in Cake Making, types and varieties, equipments, cake making methods, Product quality characteristics, faults and corrective measures of cakes.
- Other bakery products: using very hard wheat. Pizza, pastry and its types.

UNIT- IV: Modified Bakery Products

- Modified bakery products: high fiber, low sugar, low fat, gluten free bakery products.
- Decoration of baked foods – Icing and Fillings, its types and applications in bakery. Role of other ingredients used in icing and fillings.
- Staling and Nutrient Losses in Bakery Products.

REFERENCES

1. Dubey, S.C. (2007). Basic Baking 5th Ed. ChanakyaMudrak Pvt. Ltd.

2. Manay, S. &Shadaksharaswami, M. (2004). Foods: Facts and Principles, New Age Publishers
3. Hebeda, R. (Ed.). (1996). *Baked goods freshness: Technology, evaluation, and inhibition of staling* (Vol. 75). CRC Press.
4. Manley, D. (Ed.). (2011). *Manley's technology of biscuits, crackers and cookies*. Elsevier.
5. Vaclavik, V. A., Christian, E. W., & Campbell, T. (2008). *Essentials of food science* (Vol. 42). New York: Springer.

Course Outcomes - After the completion of the course, the students will be able to:

CO1 Acquire knowledge on bakery industry and products.
CO2 Comprehend the technology of processing of bakery products.
CO3 Demonstrate the skills in various types of bakery items.
CO4 Comprehend the technology of processing in handling the bakery.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3		3	3	3		3	3		3	3	3
CO2	3		3		2		3	2	3		3	3		3
CO3	3		3		3	3				1	3		3	3
CO4	2		3			3	3		2		3	3	3	

High-3, Medium-2, Low-1

FSND:405 C: FOOD PACKAGING
(Common to M.Sc Food Science Nutrition & Dietetics and MS Food Technology Course)

GENERAL ELECTIVE- THEORY

Course Objective

- Provide knowledge on packaging and packaging materials
- An overview of the scientific and technical aspects of food packaging.
- Enable the students to understand the regulations of packaging and packaging material testing.
- Knowledge of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life.

UNIT-I

- Food Packaging – Definition - Need and functions of packaging;
- Principles in the development of protective packaging.
- Deteriorative changes in food stuff and packaging methods for prevention.

UNIT-II

- Packaging Materials – Concepts, Significance and Classification.
- Packaging – Development, Unit/Retail.
- Primary Packaging Media – Properties and applications
- Paper boards, metals, plastics, wood and plywood, glass, flexible etc.
- Labels, caps and closures and wards, adhesives, inks and lacquers,
- cushioning materials, wooden Boxes, strapping and Reinforcements.

UNIT-III

- Testing and evaluation of packing media – retail packs (including shelf life evaluation) and transport packages – quality control.
- Packaging systems and methods for food products – vacuum packaging, gas flush.
- Packaging, CAP and MAP, Aseptic and retort packing, Bag-in Box etc. Food products – General classification and packing types, varieties and trends.
- Storage, handling and distribution of packages (foods) – including palletisation and Containerization – Shelf life evaluation of packet products

UNIT IV

- Food Marketing and role of packaging
- Packaging Aesthetic and graphic design.
- Packaging – Laws and Regulations – FDA, FSSA, Packaging Commodity Rules, Weight and Measures Act etc.
- Coding and Marking Including bar coding.

- Environmental and Eco issues and waste disposal.

REFERENCES

1. Bhatia S.C. Canning and Preservations of Fruits and Vegetables – New Delhi, India
2. Bureau of G and Multon J.K Food Packaging Technology (vol. 1and2) – VCH, publishers, INC, New York
3. Dalzett J.M. Food Industry and The Environment – Chapmann and Hall, London.
4. Darry, R.andT, Blackle: Principles and Application MAP – Academic and Professions.
5. Hotchikess Food and Packaging Interaction – American Chemical Society.
6. Madhavaiah M and RV Goramma;(1996). *Food Packaging Materials* , Tata Mcoraw – Hill publishing company limited,New Delhi.
7. Robertson G.L. Food Packaging – New York, Marcell Dekker, Inc.
8. Sacharow and Grifin, Food Packing – AVI Publications.
9. Sood. S.K. and MridulaSaxena.(2002). *Food Packaging,* NLERT – Booklet – New Delhi.
10. Stanley and Sacharow Food Packaging.

Course Outcomes

After the completion of the course, the students will able to –

CO1.Exposure about packaging, packaging materials and packaging methods.

CO2.Comprehend the overview of the scientific and technical aspects of food packaging

CO3.Acquire knowledge on regulations of packaging and testing.

CO4.Able to utilize some of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life.

CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										2
CO2	3	2										2
CO3	3				3							3
CO4	3			3	2							3

3-High, 2- Medium, 1- Low

FSND 406 (A): CHILD WELFARE PROGRAMME

OPEN ELECTIVE – THEORY

Course Objecives

- Define the terms 'child' and'child welfare', enlist children in need of careand difficult circumstances.
- Understand the role of government, voluntary organizationsresponsible for the welfare and development of children .
- Utilize the knowledge on child welfare programmes to disseminate information as preventive, promotive , developmental and rehabilitative manner to the disadvantaged people in the society
- Apply the knowledge aboutmonitoring and evaluation oforganizationswhen visiting and observing child welfare organizations .

UNIT – I Child Welfare programmes

Need and History of Child Welfare programmes in India.

Existing Government and Voluntary Organizations for Children in India - ICDS, ICCW, CSWB, NIPCCD, NCERT, ICSW, Women Development and Child Welfare (WD&CW), Balbhavan society - Functions and services of all NGO's like RASS, PASS, Action AID, SOS - Principles, objectives and significance of organizations and activities.

UNIT – II Different Child Welfare Organizations -

Orphanage, Juvenile homes, Home for street children and Observation homes

Administration, organization structure of Different organizations

Child labour- Child Trafficking -Prevention

UNIT-IIIMonitoring and Evaluation of Child Welfare Institutions

Purpose and objectives of monitoring, monitoring of quality,indicators of monitoring,process of monitoring.

Objectives and techniques of evaluation

Parameters for Evaluation

Process of evaluation, evaluation personnel.

UNIT-IV International Organizations

Principles, Objectives and Significance of International Organizations- UNICEF, WHO, CARE, CRY.

Changing philosophy and concept of programmes and services for children, Importance of Integrated approaches.

REFERENCES

1. Alfred.D.Souja (1973), 'Children in India', Critical Issues in Human Development, Indian Social Science Research Institute, Delhi.
2. Approaches to perspective plan on child development, NIPCCD, 1985.
3. D'Arcy, Davis-case (1989), Community Forestry: Participatory Assessment Monitoring and Evaluation, Rome: Food and Agriculture Organization.
4. Fecistein, M. (1986). Patterns in Evaluation, London: Macmillan.
5. Jayakaran, R.L. (1996). Participatory Learning and Action: User guide and manual, Madras: World Vision India.
6. Kumar, R. 'Child Development in India', Ashish Publishing House, New Delhi, Reprint 2003.
7. Paul Chowdary, D. Child Welfare and Development, Atmarani and Co., New Delhi.

Course Outcomes

After studying the course, students will able to;

CO1. Define the terms ‘child’ and‘child welfare’, enlist children in need of care and difficult circumstances viz.,orphans, street children, abused, exploited , children affected by natural calamities and disasters etc.,

CO2. Understand the role of government organizations like ICDS, NIPCCD andvoluntary organizations like ICCW , SOS villages etc. responsible for the welfare and development of children .

CO3. Utilize the knowledge on child welfare programmes to disseminate information as preventive, promotive , developmental and rehabilitative manner to the disadvantaged people in the society.

CO4. Apply the knowledge about monitoring and evaluation of organizations when visiting and observing child welfare organizations .

CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										2
CO2	3	2										2

CO3	2	2		3		2	3					2
CO4	2	2		3		2	2			3		2

3-High, 2- Medium, 1- Low

FSND 406(B): DISASTER MANAGEMENT

OPEN ELECTIVE – THEORY

Course objectives

- To know about natural disasters: manmade disasters; chemical hazards; National and International strategies to mitigate disaster management.
- To understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters;.
- To illustrate the efforts made by the NGOs, Community based organizations and local administration in disaster management.
- Discriminate disaster responses of Armed forces and Police.

UNIT I

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, Drought, Cyclone, Earthquakes, Landslides, Avalanches, Volcanic eruptions, Heat and cold Waves, Climatic Change: Global warming, Sea Level rise, Ozone Depletion

UNIT II

Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire. Oil fire, air pollution, water pollution, deforestation, Industrial wastewater pollution, road accidents, rail accidents, air accidents, sea accidents.

UNIT III

Disaster Management- Efforts to mitigate natural disasters at national and global levels. International Strategy for Disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, Community-based organizations, and media. Central, State, District and local Administration; Armed forces in Disaster response; Disaster response: Police and other organizations.

REFERENCES

1. Gupta HK. 2003. *Disaster Management*. Indian National Science Academy. Orient Blackswan.
2. Hodgkinson PE & Stewart M. 1991. *Coping with Catastrophe: A Handbook of Disaster Management*.

3. Routledge. Sharma VK. 2001. *Disaster Management*. National Centre for Disaster Management, India.

COURSE OUTCOMES

After studying the course, Students will be able to

CO 1 Gain in-depth knowledge about natural disasters; manmade disasters; chemical hazards : disaster management.

CO 2 Design and administer a schedule for collection of Information regarding the roles of NGOs, Community based organizations , central state, District and local Administration, Police and armed forces, in Disaster management

CO-PO Mapping

Coursee	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3							2	2		3
CO2	3	3						2		2		3

3-High, 2- Medium, 1- Low