

M.Sc.(Home Science)

Prospectus No. 2012199

Semester-I & III Examination - Winter-2011,
Semester-II & IV Examination - Summer-2012

संत गाडगे बाबा अमरावती विद्यापीठ
SANT GADGE BABA AMRAVATI UNIVERSITY

गृहविज्ञान विद्याशाखा
(FACULTY OF HOME SCIENCE)

PROSPECTUS

OF

M.Sc. (Home Science) (Food Science and Nutrition)

Semester-I & III Examination, Winter-2011

Semester-II & IV Examination, Summer-2012



2011

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(Semester-I to IV)
(Prospectus No.2012199)

SANT GADGE BABA AMRAVATI UNIVERSITY

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- (1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects, papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.
- (2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc. refer the University OrdinanceBooklet the various conditions/provisions pertaining to examinations as prescribed in the following Ordinances-
- Ordinance No. 1 : Enrolment of Students.
 Ordinance No.2 : Admission of Students
 Ordinance No. 4 : National Cadet Corps
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Ordinance No.19/2001	:	An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answer books and preparation of results of the examinations, conducted by the University, Ordinance 2001.

Dineshkumar Joshi

Registrar

Sant Gadge Baba Amravati University

PATTERN OF QUESTION PAPER ON THE UNIT SYSTEM

The pattern of question paper as per unit system will be broadly based on the following pattern.

- (1) Syllabus has been divided into units equal to the number of question to be answered in the paper. On each unit there will be a question either a long answer type or a short answer type.
- (2) Number of question will be in accordance with the unit prescribed in the syllabi for each paper i.e. there will be one question on each unit.
- (3) For every question long answer type or short answer type there will be an alternative choice from the same unit. However, there will be no internal choice in a question.
- (4) Division of marks between long answer and short answer type question will be in the ratio of 40 and 60.
- (5) Each short answer type question shall contain 4 to 8 short sub question with no internal choice.

Syllabus Prescribed for M.Sc. (Home Science) (Food Science and Nutrition)

Semester-I & Semester-II

(Implemented from the Academic Session 2010-11)

Semester-I

Subject Code 112FS45

Food Science

Theory : 4 Periods/Wk (4 Credits)	Theory Paper : 60
Practical : 4 Periods/Wk (2 Credits)	Theory Internal : 40
	Practical Marks : 35
	Practical Internal: 15
	Total Marks : 150

Learning objectives : After completion of course students will be able to-

- provide an understanding of composition of various food stuffs
- familiarize students with changes occurring in various food stuffs as a result of processing and cooking
- enable students to use the theoretical knowledge in various applications and food preparations

Theory

Unit 1 : Water and food dispersions

- 1.1 Physical properties of water
- 1.2 Structure of water molecule
- 1.3 Bound water
- 1.4 Colloidal systems
- 1.5 Types of food dispersions – sol, gel, emulsion and foam

Unit 2 : Polysaccharides and sugars

- 2.1 Starch
 - Flour mixtures – batters and dough
 - Leavening agents – physical, chemical and biological
 - Gluten formation
 - Gelatinisation
 - Dextrinisation
- 2.2 Sugar
 - Stages of sugar cookery
 - Crystallisation

Unit 3 : Fats and oils

- 3.1 Functional properties of fats
- 3.2 Role of fats and oils in cooking
- 3.3 Trans fatty acids
- 3.4 Fat substitutes
- 3.5 Fat deterioration and antioxidants

Unit 4 : Proteins

- 4.1 Milk and milk products - Composition of milk, properties of milk, effect of heat on milk, milk products and milk substitutes
- 4.2 Meat, fish and poultry - Composition, cooking methods, effects of cooking.
- 4.3 Fish and sea foods - Composition, changes during processing
- 4.4 Pulses and legumes - Composition, processing toxic constituents
- 4.5 Eggs -Composition, functional properties of eggs, use in cooking, egg processing, egg products
- 4.6 Protein concentrates, hydro lysates and texturised vegetable proteins

Unit 5 : Fruits and Vegetables

- 5.1 Enzymes and pigments in fruits and vegetables
- 5.2 Enzymic browning in fruits and vegetables

Practicals

- 1) Standardisation of recipes and methods of reporting recipes
- 2) Experiments on crystallisation of sugar
 - Stages of sugar cookery
 - Crystalline and non crystalline candies
- 3) Fat and oils – smoking temperatures, factors affecting absorption of fat
- 4) Experiments with eggs to study the properties of coagulation, foaming, emulsifying agent and leavening agent
- 5) Preparation and evaluation of recipes out of milk, meat and poultry
- 6) Factors affecting colour, texture and flavour of vegetables and fruits

References

- 1) Potter N. and Hotchkiss J.H. (1996) Food Science. 5th edition, CBS publishers and distributors, New Delhi
- 2) Charley H. (1982) Food Science. 2nd edition, John Wiley and sons, New York
- 3) Peckham G. and Freeland Grages G.H. (1979) Foundations of Food Preservations
- 4) Meyer L.H. (1998) Food Chemistry. CBS publishers and distributors, Shahdara, Delhi 110032
- 5) Manay M.S., Shadaksharaswamy M. (1997) Food Facts and Principles. 3rd edition, New Age International (P) Ltd. publishers, New Delhi
- 6) C. Gopalan, B.V. Rameshastri, S.C. Balasubramanian (2004) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad
- 7) Fox B. (1985) Food Science A Chemical Approach. Hoddir and Stoughton Educational, Bungay Suffolk.

Semester-I
Subject Code : 113HP46
Human Physiology

Theory : 4 Periods/Wk (4 Credits)

Theory Paper : 60

Theory Internal : 40

Total Marks : 100

Learning objectives :

After completion of course students will be able to understand relationship of physiology and role of nutrition.

Theory**Unit 1 : Introduction to Physiology**

- 1.1 Physiology of growth and development
- 1.2 Physiology of aging
 - Free radical theory of aging
 - Physiological mechanisms to limit free radical damage
 - Caloric restriction, antioxidants and aging

Unit 2 : Enzymes

- 2.1 Introduction to enzymes and coenzymes
- 2.2 Nomenclature and classification of enzymes

2.3 Role of enzymes and coenzymes in metabolism

2.4 Enzymes in clinical diagnosis

Unit 3 : Hormones

3.1 Introduction to hormones

3.2 Classification of hormones

3.3 Role of hormones in nutrition and health

Unit 4 : Nutrogeomics

4.1 Genes and disease

4.2 Genetic variation and dietary response

4.3 Gene nutrient interactions

4.4 Role of nutrients in gene expression

Unit 5 : Maintenance of Body Homeostasis

5.1 Homeostasis – An introduction

5.2 Body fluids – essential to maintain body homeostasis

5.3 Methods of measuring body fluids

References

- 1) Applied Physiology, MFM 001 Course, Indira Gandhi National Open University
- 2) Vander A.J., Sherman J.H., Luciono D.S. (2000) Human Physiology. 7th edition, New York, McGraw Hill
- 3) Jain A.K. Textbook of Physiology. Vol. I and II, Avichal publishing co., New Delhi
- 4) Guyton A.C. and Hall J.B. (1996) Textbook of Medical Physiology. 9th edition, W.B. Sanders Company, Prism Books (Pvt.) Ltd., Bangalore.

Semester-I

Subject Code : 112FH47

Food and Human Behaviour

Theory : 2 Periods/wk /(Credits 2)	Theory Paper	:35
Practical : 2 Periods/wk /(Credits 1)	Th. Int.Asst.Mks.	:15
	Pra.Int.Ass.Mks.	:25
	Total Mks.	:75

Learning Objectives :- After completion of the course, students will be able to-

- understand indicators of human behaviour.
- know various factors influence dietary practices of individual.

- understand consequences of the behaviour on health.

- know means of modifying food behaviour.

- develop skill of developing scale.

Unit-I: Indicators of Human Behaviour :

- Knowledge.

- Attitude

- Practice.

Meaning, measuring techniques and tools.

Unit-II: Relation of knowledge, attitude and practice about food in changing food behaviour for good nutrition.

Unit-III: ■ Factors affecting food Behaviour :

- Agricultural

- Economic

- Environmental

- Socio-cultural

- Psychological

- Religious.

➤ Role of industrialization, urbanization, work pattern, mass media etc. in changing food behaviour.

Unit-IV: ● Food behaviour and linkages with health.

Unit-V: Communication strategies for modifying food behaviour (knowledge, attitude and practice)

Practical Internal Assessment :-

(1) Study of KAP Tools (Scales)

(2) Developing KAP scales for food behaviour study.

(3) Study of Indigeneous/traditional dietary pattern of community and factors affecting.

(4) Study of facts, fallacies and beliefs – indentifying positive, neutral and negative implications.

References :-

(1) Sanjur, D. (1982), Social and Cultural Perspectives in Nutrition, Prentice Hall, Inc.

(2) Long, P.J., Shann, B. (1983), Nutrition and Inquiry into the issues, Prentice Hall, Inc.

(3) Blix, G. (1978), Food Cultism and Nutrition Quackery, Almgvist and Wiksels, Uppasala.

- (4) Gillespie, S. Mc Neil, G. (1992), Food, Health and Survival in Developing Countries, Oxford University Press.
- (5) Oskamp, Stuart, (1987), Attitudes and Opinions, Prentice Hall.
- (6) Okediji, O.F. (1973) Theoretical and Methodological Critique of surveys of knowledge, Attitude and Practice of Family Planning in Africa. International Review of Modern Sociology, Vol.3(i), March.
- (7) Davis, D. and T.Ostrom (1987), Attitude Measurement in concise Encyclopaedia of Psychology (ed) J.Ramond Cossini, John Wiley and Sons, New York.
- (8) Goode j., Wand P.K.Hatt (1952), Methods in Social Research, McGraw Hill, New York.

Semester-I

Subject Code : 112NP48

Nutrition Programme Design and Evaluation

Theory : 2 Periods/wk/(Credits 2)

Theory Paper : 35

Practical : 4 Periods/wk/(Credits 2)

Th. Int.Asst.Mks. : 15

Pra.Int.Ass.Mks. – 50

Total Mks. : 100

Learning Objectives :- After completing this course, students will be able to-

- understand the process of programme design.
- develop ability in planning nutrition programmes.

Unit-1 : Programme Planning and Implementation :

1.1 Planning

- Meaning and importance.
- Pre-requisites for developing plan (short and long term)
- Programme Planning Processes.

1.2 Implementation

- Aspects of execution
- Factors responsible for successful conduct of programme.

Unit-2 : 2.1 Evaluation

- Meaning and purpose of Evaluation.
- Types and tools of Evaluation.

2.2 Follow up

- Need for follow up.
- Methods of follow up

2.3 Documentation

- Need for reporting and recording.
- Aspects to be covered.

Unit-3 : Nutrition Programme Design

3.1 Formulation of objectives and target group.

3.2 Resource Mapping.

3.3 Administrative Structure.

3.4 Implementation process.

3.5 Monitoring and evaluation of designed programme.

Unit-4: Study the programme design and evaluation aspects of following ongoing nutrition programme-

4.1 ICDS.

4.2 Nutrient Deficiency Control Programme.

4.3 Supplementary Feeding Programmes

4.4 Food Security Programmes.

Unit-5 : Management Informations System -MIS.

Practical :-

- Design nutrition awareness/ skill development counselling / diagnostic / assessment programme.
Implement, Evaluate and take follow up and document.
- Visit ongoing nutrition programmes.

References :-

- 1) Albrecsht, H. et. al. (1989). Rural Development Series Agricultural Extension Vol. I & II. Basic concepts and methods, Wiley Eastern Limited, New Delhi.
- 2) Chaubey, B.K. (1979). A Handbook of Extension Education, Jyoti Prakashan; Allahabad.
- 3) Dahama, O.P. and Bhatnagar, O.P. (1987). Education and Communication for development. Oxford and IBH Publishing Co., Pvt. Ltd.; New Delhi.
- 4) Extension Education in Community Development. (1961). Ministry of Food and Agriculture. Government of India, New Delhi.
- 5) Pankajam, G. (2000). Extension - Third Dimension of Education, Gyan Publishing House ; New Delhi.

- 6) Ray, G.L. (1999). Extension Communication and Management. Naya Prokashi; Calcutta.
- 7) Reddy, A. (1999). Extension Education, Sree Lakshmi Press, Bapatla.
- 8) Sandhu, A.S. (1994) Extension Programme Planning. Oxford & IBH Publishing Company Private Limited, New Delhi.
- 9) Singh, R. (1987) Textbook of Extension Education. Sahitya Kala Prakashan, Ludhiana.
- 10) Supe, S.V. (1982). Introduction to Extension Education. Oxford Publishers; New Delhi

Semester-I

Subject Code : 111CA49

Computer Application in Food Statistics

Practical : 4 Periods/wk (Credits 2)	Practical Mks. :	35
	Pra.Int.Ass.Mks. :	15
	Total Mks. :	50

Learning Objectives :- After completing course students will be able to-

- understand use of excel in analysis of data related to food and nutrition.
- develop skill of drafting text, tables, figures, etc.

Practical :

- (1) Computer Basics
 - 1.1 Computer Hardware and software.
 - 1.2 Input and out put devices.
 - 1.3 Basic Operations in data handling (copy, paste, prepare file / folder, burn CD's etc.)
- (2) MS Word
 - 2.1 Introduction to MS Word.
 - 2.2 Use for drafting letters and reports.
- (3) MS Excel
 - 3.1 Introduction to MS Excel.
 - 3.2 Drafting tables.
 - 3.3 Use for statistical analysis in Nutrition.

Descriptive Statistics – Mean, standard deviation.
Correlation – Pearson correlation between two or more variables.
Parametric test – t test, z test, analysis of variance.

Non-parametric test – chi test.

3.4 Graphical Presentation – Graphs and bar diagrams.

- (4) Introduction to applicable statistical analysis softwares.

References :-

- (1) Literature of MSCIT.
- (2) Garrett, Henry E. (1971), Statistics in Psychology and Education, David Hanley and Co.
- (3) Edward, Experimental Design in Psychological Research.
- (4) Kerlinger, Foundation of Educational Research.

Semester – II

Subject Code : 122FM50

Food Microbiology

Theory : 3 Periods/Wk (3 Credits)	Theory Paper : 45
Practical : 2 Periods/Wk (1 Credit)	Theory Internal : 30
	Practical Marks : 20
	Practical Internal : 05
	Total Marks : 100

Learning objectives : After completion of course students will be able to

- gain knowledge of role of microorganisms in humans and environment
- understand the importance of microorganisms in food spoilage
- understand the role of microbes in food borne disorders and integrated approach to food safety

Theory

Unit 1 : Food Microbes :

- 1.1 Microorganisms in foods
- 1.2 Factor affecting multiplication and survival of microorganisms
- 1.3 Control of microbial growth in foods

Unit 2 : Food Spoilage

- 2.1 Causes of food spoilage
- 2.2 Role of microbes in food spoilage
- 2.3 Factors affecting food spoilage
- 2.4 Changes in foods caused by microbes

Unit 3 : Modes of disease transmission

- 3.1 Routes of disease transmission
- 3.2 Source of contamination

Unit 4 : Food borne illnesses

- 4.1 Types of food borne illnesses
- 4.2 Control of food borne illnesses

Unit 5 : Food Safety

- 5.1 Concept and importance of safe foods
- 5.2 Importance of sanitation and hygiene in foods
- 5.3 Integrated approach to food safety
 - Good hygiene practice (GHP)
 - Good manufacturing practice (GMP)
 - Hazard analysis critical control point (HACCP)
 - Microbial risk assessment
 - Quality management ISO series
 - Total quality management

Practicals

- 1) Preparation of common laboratory media and special media for cultivation of bacteria, yeast and moulds.
- 2) Preparation of bacterial smears, simple staining, differential staining, spore staining, staining of moulds and yeast.
- 3) Isolation of microorganisms – different methods and maintenance of cultures of microorganism.
- 4) Bacteriological analysis of water.
- 5) Bacteriological analysis of foods.
- 6) Visits to food processing unit or any other organization dealing with advanced methods in food microbiology.

References

- 1) Ranganna S. (1986) Handbook Analysis and Quality Control for Fruit and Vegetable Products. 2nd Edition, Tata McGraw Hill publishing Co. Ltd., New Delhi
- 2) Roday S. (1999) Food Hygiene and Sanitation. 1st Edition, Tata McGraw Hill publishing Co. Ltd., New Delhi
- 3) Chris Bell, Paul Neaves and Anthony Williams (2005) Blackwell publishing
- 4) William Frazier and Dennis Westhoff (1995) 4th Edition, Tata McGraw Hill publishing Co. Ltd., New Delhi

Semester – II**Subject Code : 122NB51****Nutritional Biochemistry**

Theory : 3 Periods/Wk (3 Credits)	Theory Paper	: 45
Practical : 4 Periods/Wk (2 Credits)	Theory Internal	: 30
	Practical	: 35
	Practical Internal	: 15
	Total Marks	: 125

Objectives : After completion of course students will be able to-

- augment the biochemistry knowledge acquired at the under graduate level
- understand the mechanism adopted by human body for regulation of metabolic pathways
- become proficient for specialization in nutrition
- perform biochemical analysis with accuracy and reproducibility

Theory**Unit 1 : Human Energy Requirements**

- 1.1 Definition and components of energy requirement-Basal, Metabolic rate and Physical activities.
- 1.2 Factors affecting energy requirement and expenditure
- 1.3 Methods of estimation of energy requirement and expenditure

Unit 2 : Carbohydrates

- 2.1 Review of chemistry of carbohydrates
- 2.2 Metabolism of carbohydrates, oxidation of glucose by glycolysis and Krebs cycle. Glycogen synthesis and breakdown. Regulation of blood glucose

Unit 3 : Proteins

- 3.1 Review of chemistry of proteins
- 3.2 Protein Metabolism :- Protein Biosynthesis
- 3.3 Metabolism of amino acids –Transamination, deamination and decarboxylation.
- 3.4 Metabolic disorders of amino acids

Unit 4 : Lipids

- 4.1 Review of chemistry of lipids
- 4.2 Metabolism of lipids – Synthesis of triacyl glycol, β -oxidation of fatty acids
- 4.3 Cholesterol biosynthesis and its regulation
- 4.4 Ketosis

- Unit 5 :**
- 5.1 Review of chemistry of vitamins.
 - 5.2 Biochemical role of water soluble and fat soluble vitamins
 - 5.3 Biochemical role of macro and micro minerals

Practicals

- 1) Introduction to Laboratory Equipments – Digital weighing balance, pH meter, Photo Electric Colorimeter, Spectro photometer etc.
- 2) Estimation of glucose in blood.
- 3) Estimation of serum protein
- 4) Analysis of lipids from serum
- 5) Analysis of food
 - Total protein content
 - Total fat content
 - Total carbohydrate content
- 6) Estimation of vitamin 'C' in foods
- 7) Estimation of calcium in foods
- 8) Estimation of iron in foods
- 9) Chromatographic separation of amino acids in food stuffs
- 10) Survey of Pathological Laboratories – To obtain information about the methods used for blood / urine analysis and submit a report.

References

- 1) Deb A.C. (2008) Fundamental of Biochemistry. 9th edition, New Central Book Agency (P) Ltd., 8/1 Chintamani Das Lane, Kolkatta
- 2) Satyanarayana C., U.Chakrapani (2007) Biochemistry. 3rd edition, Biochemistry Books and Allied (P) Ltd. Shubham Plaza, Kolkatta
- 3) Cox M.M., Melson D.L. (2008) Lebninger Principles of Biochemistry. 5th edition, W.H. Freeman and Company, New York
- 4) Sathe A.Y. (1999) A First Course in Food Analysis. New Age International (P) Ltd. publishers, New Delhi.
- 5) Berwal J.S., Grewal R.B., Kapoor C.M., Garg M.K. (2004) Practical Methods in Food Analysis. Agrotech publishing academy, Udaipur

Semester – II**Subject Code : 122CA52****Communication Approaches in Nutrition**

Theory : 3 Periods/Wk (3 Credits)	Theory Paper	:45
Practical : 4 Periods/Wk (2 Credits)	Theory Internal	:30
	Practical Internal	:50
	Total Marks	:125

Objectives : After completion of course students will be able to-

- understand use of communication approaches in improving nutritional status of the population of different sector
- develop skill of preparing tools of communication

Theory**Unit 1 : Approaches of Communication in Nutrition**

- 1.1 Traditional Approach
 - Folk media – songs, story, shows
- 1.2 Modern Approach
 - Participatory
 - Analytical
 - Dialogue
 - Persuasive
 - Educational
- 1.3 Modified Approach
 - Combination of traditional and modern approaches
- 1.4 Presentation of above approaches

Unit 2 : Methods of Communication

- 2.1 Individual communication
- 2.2 Group communication
- 2.3 Mass communication
- 2.4 Planning and preparation of communication methods

Unit 3 : Projected tools of communication

- 3.1 Transparencies for OHP
- 3.2 Soft copy of presentation (CD and Pen drive) for computer and computer aided projectors
- 3.3 Other E. learning material
- 3.4 Script for radio and TV
- 3.5 Preparation and presentation of projected tools

Unit 4: Non projected tools of Communication

- 4.1 Model – Working, non-working
- 4.2 Print material – Leaflets, folders, posters, charts, flash cards, news letter, circular letter, bulletin
- 4.3 Preparation of non projected tools

Unit 5 :

- 5.1 Themes and Messages
 - Themes for nutrition education
 - Messages for nutrition education
- 5.2 Strategies in nutrition education
 - Individual
 - Community
 - Presentation of the operation of strategies

Practicals

- Identify themes of nutrition education through literature research, experiences, pilot study/survey and prepare, present and evaluate following projected and non projected tools for effective communication.

Posters, Banners, Slogans, Charts, Flash cards, Folder, Leaflets, Games, Transparencies, CD, Scripts.

Note : Any two out of projected and two out of non projected tools.

References

- 1) Maan, Gurmeet Singh (1987) The Story of Mass Communication : An Indian Perspective. New Delhi, Harnam Publishers.
- 2) Tiwari I.P. (1987) Communication Technology and Development. New Delhi, Ministry of Information and Broadcasting.
- 3) Sharma S.C. (1987) Media Communication and Development. Jaipur, Rawat Publishers.
- 4) Gamble M.W. and Gamble T.K. (1989) Introducing Mass Communication. IInd Ed. New York, McGraw Hill Book.
- 5) Day P.R. (1977) Methods of Learning Communication Skills. Oxford, Peragamon.
- 6) Hartman, Paul and others (1986) The Mass Media and the Village Life : An Indian Study. New Delhi, Sage Publication.
- 7) Melkote S.R. (1991) Communication for Development in Third World : Theory and Practice. New Delhi, Sage.

- 8) Bhatnagar S. and Satyapal A. (eds.) (1988) education and Communication Technology : Perspective, Planning and Implementation. New Delhi.
- 9) Scott B. (1986) The Skills of Communication. Aldershot Gower Press.
- 10) Joshi P.C. (1989) Culture Communication and Social Change. New Delhi, Vikas Publications.
- 11) Mahajan K. (1990) Communication and Society. New Delhi, Classical Publications.

Semester – II**Subject code : 122ED53****Entrepreneurship Development in Food**

Theory : 3 Periods/Wk (3 Credits)	Theory Paper	: 45
Practical : 2 Periods/Wk (1 Credit)	Theory Internal	: 30
	Practical Marks	: 20
	Practical Internal	: 05
	Total Marks	: 100

Objectives : After completion of course students will be enable to

- provide conceptual inputs regarding entrepreneurship development in food
- sensitise and motivate towards entrepreneurship development
- orient and impart knowledge towards identifying and implementing entrepreneurship opportunities

Theory**Unit 1 : Conceptual Framework**

- 1.1 Concept, need and process in entrepreneurship development
- 1.2 Types of enterprise – merits and demerits
- 1.3 Role of enterprise in national and global economy

Unit 2 : The Entrepreneur

- 2.1 Entrepreneurial motivation – dynamics of motivation
- 2.2 Entrepreneurial competency – concepts
- 2.3 Developing entrepreneurial competencies – requirements and understanding the process of entrepreneurship development, self awareness, interpersonal skills, creativity, assertiveness, achievement, factors affecting entrepreneur's role

Unit 3 : Launching and Organising an Enterprise

- 3.1 Environment scanning – information, sources, schemes of assistance, problems
- 3.2 Enterprise selection, enterprise, feasibility study, SWOT analysis
- 3.3 Resource mobilization – finance, technology, raw material, site and man power
- 3.4 Market assessment, costing and quality control

Unit 4 : Areas of Entrepreneurship

- 4.1 Production and marketing of value added food products, therapeutic products, low cost nutritious food products, indigenous food products, supplementary foods
- 4.2 Consultancy areas – Diet counseling through diet clinics, Health clubs, Diagnostic/Assessment centre of nutritional status
- 4.3 Services – Catering daily meals, therapeutic diets, pack lunch, meals for occasions, food analyser

Unit 5 : Agencies for Development of Entrepreneurship

- 5.1 Government of India's policy towards promotion of entrepreneurship reservations and sanctions for small scale sector
- 5.2 Role of SSI, Procedures and formalities for setting up SSI
- 5.3 Role of banks and other agencies for development of entrepreneurship

Practicals

- 1) Enlist entrepreneurial opportunities in Food Science and Nutrition.
- 2) Select any enterprise and prepare a report of SWOT analysis.
- 3) Visit to funding agencies offices for understanding the formalities for registrations and the licences for enterprise.
- 4) Prepare and use the business games for development of entrepreneurial qualities.

References

- 1) Hisrich R.D. and Peters M.P. (1995) Entrepreneurship – starting, developing and managing a new enterprise. Richard D. Irwin INC, USA.
- 2) Meredith C.G. et al (1982) Practice of Entrepreneurship. ILO , Geneva.

- 3) Deshpande M.V. (1984) Entrepreneurship of small scale industries, concept, growth and management. Deep and Deep Publication D-1/24, R-Garden, New Delhi.
- 4) Parekh U. and Rao T.V. (1978) Personal Efficacy in Development Entrepreneurship, Learning system. New Delhi.
- 5) Vasant Desai (1991) Entrepreneurship and Entrepreneur Development, Vol. I, II, III, Himalaya Publishing House.
- 6) Maratha Chamber of Commerce, Industrial Development of Maharashtra, Latest edition.

Semester – II**Subject code : 122RM54****Research Methods in Nutrition**

Theory : 3 Periods/Wk (3 Credits)	Theory Paper : 45
Practical : 2 Periods/Wk (1 Credits)	Theory Internal : 30
	Practical Internal : 25
	Total Marks : 100

Objectives : After completion of course students will be able to

- know importance of research in food science and nutrition
- understand the types, tools applicable to research problem
- construct common data collection tools
- develop skills of preparing out line of research work

Theory**Unit 1 : Foundation of Scientific Research**

- 1.1 Research – meaning and definition
- 1.2 Need of research in food science and nutrition
- 1.3 Research process
 - Selection and formulation of research problem
 - Specifying objectives
 - Formulating hypothesis
 - Deciding variables

Unit 2 : Design Strategies in Research

- 2.1 Descriptive studies
 - Correlation studies
 - Case studies
 - Cross sectional/Survey

- 2.2 Analytical studies
- Observational studies
 - Cohort studies
 - Cross sectional studies/Survey

Unit 3 : Methods of Sampling

- 3.1 Characteristics of good sampling
 3.2 Probability or random sampling
 3.3 Non probability sampling

Unit 4 : Research Tools

- 4.1 Levels of data measurements and characteristics of good measurement
 4.2 Types of tools and their uses
- Questionnaire
 - Schedule
 - Rating scale
 - Attitude scale
 - Interview – structured and unstructured
 - Observation – participant and non participant
- 4.3 Concept of data
- Types of Data – Qualitative and Quantitative data
 - Analysis of Data – Qualitative and Quantitative data analysis

Unit 5 : Statistical Testing of Hypothesis

- 5.1 Application of parametric tests
- r test
 - t tests
 - Z test
 - F test
 - ANOVA
- 5.2 Application of non parametric tests
- Chi square test
 - Spearman's Rank correlation

Practical :

- 1) List research areas in food science and nutrition
- 2) Prepare synopsis/outline of dissertation work

- Select problem for dissertation from literature research, experience of guide & teachers, and experiment/pilot study.
 - Find out key words, their meaning and definitions from dictionary and encyclopedias.
 - Design conceptual model of the study.
 - Collect review on selected variables from national and international journals and prepare note cards and reference cards (follow the rules of scientific writing)
 - Decide and prepare tools of measurement of variables
 - Specify objectives
 - Frame hypothesis
 - Select locale of the study
 - Decide sample size and sampling techniques
 - Decide applicable statistical tests
- 3) Conduct pilot study for calculating validity, reliability and usability of the tools.
 - 4) Prepare master table for analysis
 - 5) Prepare time schedule and facilities required for your dissertation work.

References

- 1) Van Maanen (1983) *Qualitative Methodology*. Sage Publication
- 2) Sumati Mulay and Sabarathanam V.E. (1980) *Research Methods in Extension Education*. New Delhi, Sole Selling Agents, MANASHYAN, 32.
- 3) Bryman A. and Cramer D. (1994) *Quantitative Data Analysis for Social Scientist*
- 4) Aravindra Chandra and Saxena T.P. *Style Manual for Writing : Thesis, Dissertations and Papers in Social Sciences*. New Delhi, Metropolitan Book Co. Pvt. Ltd.
- 5) Kerlinger, *Foundation of Educational Research*
- 6) Ingle P.O. *Scientific Report Writing*. Nagpur, Sarla P. Ingle.

(Note: The syllabi for General Interest Course shall be as per Science faculty.)

Syllabus Prescribed for M.Sc. (Home Science) (Food Science and Nutrition)

Semester-III & Semester-IV

(Implemented from the Academic Session 2011-12)

Semester-III

Subject Code : 232FP55

Food Product Development

Practical :- 4 Periods/wk (Credits 2)	Practical Marks :- 35
	Pra.Int.Marks :- 15
	Total Marks :- 50

Learning Objectives :- After completion of the course the students will be able to develop products which meeting consumer needs and nutritionally and commercially viable.

Practicals :-

- Market survey, consumer survey to identify new products in terms of-
 - Line Extension
 - Repositioning existing products
 - New form / Reformulation
 - New packaging of existing products.
 - Innovative products.
 - Creative products.
- Tapping traditional foods and unconventional sources of foods.
- Identification of product for development.
- Development and screening of the products.
- Project report.

References :-

- Fuller G.W. (1994) – New Product Development : From concept to market place, CRC Press, New York.
- Craft, E and Saguy I.S. (1991) – Food Product Development : From concept to market place, Van Nostrand Reinhold, New York.
- Oickle, J.G. (1990) – New Product Development and Value Added. Food Development Division Agriculture, Canada.

Journals :-

- International Journal of Food Science and Technology.
- Food Technology
- Journal of Food Technology.
- Trends in Food Science and Technology
- Critical reviews in Food Science and Nutrition.

Semester-III

Subject Code : 232SE56

Sensory Evaluation

Practical :- 4 Periods/wk (Credits 2)	Practical Marks :- 35
	Pra.Int.Marks :- 15
	Total Marks :- 50

Learning Objectives :- After completion of the course the students will be able to-

- use various sensory methods for evaluating of variety of foods.
- analyze and interpret sensory evaluation data.

Practicals :-

- Establishing sensory panels-
Selecting and recreating panels, orienting, screening for trained panels, training panelllets, monitoring the performance.
- Analytical Tools :- (i) Difference, (ii) Ranking, (iii) Descriptive, (iv) Scoring, (v) Rating.
- Planning a sensory experiment –
 - Designing the questionnaire and score card.
 - Identifying descriptors.
 - Designing sensory testing facilities.
- Conducting the test –
 - Preparing the samples.
 - Using reference samples.
 - Reducing panel response error.
 - Product marketing.
 - Shelf life studies.
- Collecting and analyzing sensory data, statistical analysis, inter prevention.
- Report writing.

References :-

- (1) Ranganna S. (2003), Handbook of analysis and quality control for fruit and vegetable products. Tata McGraw Hill Publishing Company Limited 7, West Patel Nagar, New Delhi.
- (2) Moskowitz H.R. (1983), Product testing and sensory evaluation of foods : Marketing and Research and Development approaches. Food and Nutrition Press, Connecticut.
- (3) Watts B.M., Ylimaki, G.L., Jeffery L.E., and Elias L.G. (1989), Basic Sensory Methods for Food Evaluation. The international development research centre, Ottawa, Canada.

Semester-III**232ELI57 : Elective-I****Subject Code : 232ELI.1****Therapeutic Nutrition**

Theory : 3 Periods / wk (Credits 3)	Theory Marks	: 45
Practical :- 4 Periods/wk (Credits 2)	Th.Int.Ass.Mks.	: 30
	Practical Marks	: 35
	Pra.Int.Marks	: 15
	Total Marks	: 125

Learning Objectives :- The course will enable the students to-

- (1) understand the etiology, physiologic and metabolic anomalies of acute and chronic diseases and patient needs.
- (2) know the effect of the various diseases on nutritional status and nutritional and dietary requirements.
- (3) be able to recommend and provide appropriate nutritional care for prevention / and treatment of the various diseases.

Course Contents :**Theory :**

- Unit-1 :** 1.1 Nutritional screening and assessment of Nutritional status of hospitalized and outdoor patients- Identification of risk patients, assessment of patient needs based on interpretation of patient data – clinical, biochemical, personal etc.

- 1.2 Drug, nutrient and drug interaction, dosage and efficacy.
- Unit-2:** Meaning, causes, signs and symptoms, complications, nutritional and dietary considerations of Cardiovascular Diseases-
- Hypertension.
 - Atherosclerosis.
- Unit-3:** Meaning, causes, signs and symptoms, complications, nutritional and dietary considerations of -
- Obesity and underweight.
 - Diabetes mellitus- Type I diabetes and Type II diabetes.
- Unit-4:** Meaning, causes, signs and symptoms, complications, nutritional and dietary considerations of -
- Renal disorders.
 - Glomerulonephritis
 - Acute Renal Failure
 - Urinary Calculi
 - Chronic Renal Failures
- Unit-5:** Meaning, causes, signs and symptoms, complications, nutritional and dietary considerations of -
- Cancer
 - Burns.

Practical :-

- (1) Collect history of patients (personal, clinical, pathological, medicinal) said in theory.
- (2) Study the cases, correlate the patient data and set the objectives for diet planning and counseling.
- (3) Plan, prepare and evaluate diets.

References :-

- (1) Mohan, L.K. and Escott-Stump, S. (2000) : Kraw's Food Nutrition and Diet Therapy, 10th Edition, W.B.Saunders Ltd.
- (2) Shrilakshmi B. (1998) : Dietetics, Wiley Eastern Ltd., Pune
- (3) Joshi S.A. (1992) : Nutrition and Dietetics, Tata McGraw Hill Publishing Co.Ltd., New Delhi.
- (4) Dietary Guidelines for Indians – A manual NIN ICMR Hyderabad.
- (5) Gopalan et al (1990) : Nutritive value of Indian Foods, NIN ICMR Hyderabad.

- (6) Swaminathan M. (1985) : Human Nutrition and Dietetics, Bappco, Bangalore.
- (7) Mehtab Bamji et al (1996) : Text Book of Human Nutrition, Oxford and IBH Publishing Co. Ltd., New Delhi.
- (8) Raghuram T.C. (2000) : Diet and Diabetes, NIN Hyderabad.
- (9) Kamala Krushnamurthy (2000) : Diet and Hear Disease, NIN Hyderabad.

Semester-III

232ELI57 : Elective-I

Subject Code : 232ELI.2

Assessment of Nutritional Status

Theory : 3 Periods / wk (Credits 3)	Theory Marks :-45
Practical :- 4 Periods/wk (Credits 2)	Th.Int.Ass.Mks. :-30
	Practical Marks :- 35
	Pra.Int.Marks :- 15
	Total Marks :- 125

Learning Objectives :- After completion of the course the students will be able to-

- (1) orient the students with all methodologies applied in nutritional assessment and surveillance of human groups.
- (2) develop specific skills to apply the most widely used methods.

Course Contents :

Theory :

- Unit-1:** Nutritional Assessment – meaning, importance.
- Unit-2:** Current methodologies of assessment of nutritional status, their interpretation and comparative applications of the following.
- Food consumption.
 - Anthropometry
 - Clinical and laboratory.
- Unit-3 :** Rapid assessment and PRA.
- Unit-4:** Nutritional surveillance and basic concepts, uses and setting up of surveillance system.
- Unit-5:** Monitoring and evaluation.

Practical :-

- (1) A small evaluation study of nutrition project.
- (2) Community based project for assessment of nutritional status of any vulnerable group.

References :-

- (1) Jelliffe, D.B. and Jelliffe E.F.P. (1989), Community Nutritional Assessment, Oxford University Press.
- (2) Gopallan T. and Sheshadri S. (1987), Nutritional Monitoring and Assessment, Oxford University Press.

Semester-III

232ELI57 : Elective-I

Subject Code : 232ELI.3

Kitchen Planning, Equipments and Plants

Theory : 3 Periods / wk (Credits 3)	Theory Marks :-45
Practical :- 4 Periods/wk (Credits 2)	Th.Int.Ass.Mks. :-30
	Practical Marks :- 35
	Pra.Int.Marks :- 15
	Total Marks :- 125

Learning Objectives :- After completion of the course the students will be able to-

- (1) understand the importance of layout in a food service unit.
- (2) determine the factors that affect the kitchen plan.
- (3) understand the principle of planning layout.
- (4) design a kitchen keeping in mind the principles of planning.

Course Contents :

Theory :

- Unit-1:** Meaning and importance of kitchen planning. Factors affecting kitchen planning.
- Unit-2:** Determining kitchen layout on menu pattern. Principles of layout, establishment of work centre sequence for work from receiving to service.
- Unit-3:** Schematic Plan, establish flow of work, work and method study.
- Unit-4:** Designing Kitchen : Determining material to be used at work centers, architectural features, floor, walls, lighting, plumbing ventilation, etc.

Unit-5: Criteria for selection of equipments, types of equipments, installation of equipments, care of equipments.

Practicals :-

- (1) Plan and draw kitchen layout for a small food service unit.
- (2) Conduct market survey of kitchen equipments for projecting trends in equipment.
- (3) Market survey of materials to be used at work centers.

References :-

- (1) Sethi, M. Malhan (1993) : Catering Management, An integrated approach, Wiley Eastern, New Delhi.
- (2) Avery, A.C. (1980) : A Modern guide to food service equipment, FBI Publishing co., INC, BOSTON.
- (3) Kotschevar, L.H.; Terrells M.E. (1985) : Food Service Planning, Layout and equipment, 3rd Edition, John wiley and Sons, new York.

Semester-III

232ELII58 : Elective-II

Subject Code : 232ELII.1

Biochemical Correlation with Nutritional Therapy

Theory : 3 Periods / wk (Credits 3)	Theory Marks :-45
Practical :- 4 Periods/wk (Credits 2)	Th.Int.Ass.Mks. :-30
	Practical Marks :- 35
	Pra.Int.Marks :- 15
	Total Marks :- 125

Learning Objectives :- After completion of the course the students will be able to correlate signs and symptoms, pathological condition of patient and nutritional requirement.

Course Contents :

Theory :

- Unit-1:** Biochemistry of the Disease and Nutrition in :
- 1.1 Upper Gastrointestinal tract disorders –
 - Indigestion and dyspepsia.
 - Peptic Ulcer.

- 1.2 Lower Gastrointestinal tract disorders –
 - Ulcerative Callitis.
 - Irritable Bowel syndrome
 - Diaverticular Disease

- Unit-2 :**
- 2.1 Biochemistry of the Disease and Nutrition in Liver, Exocrine, Pancreas :
 - Viral hepatitis.
 - Cirohosis
 - Pancreatitis.

- Unit-3:**
- 3.1 Biochemistry of the Disease and Nutrition in Anemia :
 - Iron deficiency anemia – iron related blood disorder.
 - Pernicious anemia – B₁₂ deficiency anemia.
 - Sickle Cell Anemia – Non nutritional anemias.
 - Thalassemia – Non nutritional anemias

- Unit-4:**
- 4.1 Biochemistry of the Disease and Nutrition in :
 - Osteoporosis
 - Arthritis
 - Gout

- Unit-5:**
- 5.1 Biochemistry of the Disease and Nutrition in :
 - Allergy
 - Infections.
 - Stress

Practical :-

- (1) Glucose estimation in solution and in blood.
- (2) Determination of protein content using biuret method.
- (3) Estimation of Cholesterol.
- (4) Estimation of hemoglobin content in blood.

Practical :-

- (1) L.Kathlin Mahan, Sylvia Escott-Stump, Krause's Food, Nutrition and Diet Therapy, 11th Edition (2000) Saunders, An imprint of Elsevier. The Curtis centre, Independence square, West Philadelphia, Pennyloania.
- (2) U.Satgurunarayana, U.Chakrapani (2007) : Biochemistry Books and Allied (P.) Ltd., Kolkata.
- (3) Deb A.C., Fundamentals of Biochemistry (2008), New Central Book Agency, Chintamani Das Lane, Kolkata.

Semester-III
232ELII58 : Elective-II
Subject Code : 232ELII.2
Nutritional Epidemiology

Theory : 3 Periods / wk (Credits 3)	Theory Marks :-45
Practical :- 4 Periods/wk (Credits 2)	Th.Int.Ass.Mks. :-30
	Practical Marks :- 35
	Pra.Int.Marks :- 15
	Total Marks :- 125

Learning Objectives :- After completion of the course the students will be able to-

- (1) understand the principles of epidemiology, nutritional epidemiology and its importance in community and public health.
- (2) to design and evaluate studies / nutritional programme.

Course Contents :

Theory :

- Unit-1 :** 1.1 Introduction to Epidemiology
 1.2 Epidemiology : concept and definitions, aims.
- Unit-2 :** 2.1 Basic measurements in epidemiology.
 2.2 Tools of measurement – Rates, Ratios and proportions.
- Unit-3 :** 3.1 Design strategies in epidemiological research.
 3.2 Types of studies – Descriptive studies – Correlational, cross-sectional and case study.
- Unit-4:** Analytical Epidemiology – Observational studies cohort, case control and cross sectional analytic study.
- Unit-5 :** 5.1 Experimental epidemiology – Randomized controlled.
 5.2 Design and planning of nutritional epidemiology studies.
 5.3 Evaluation of epidemiological studies.

Practical :-

- (1) Study the designs said in Unit-3 & 4 in nutrition research.
- (2) Plan, implement and evaluate nutrition research.

References :-

- (1) Anisa Basheer (1995) : Environmental Epidemiology, Rawat Publications, Jaipur.

- (2) Beghin I. Cap, M. and Dujardan, B. (1988), A guide to nutritional status assessment, WHO, Geneva.
- (3) Parks K., Park : Text Book of Preventive and Social Medicine, Eighteenth Edition, M/S Banarasidas, Bhanot Publishers, 1167, Prem Nagar, Jabalpur, 482001.

Semester-III
232ELII58 : Elective-II
Subject Code : 232ELII.3
Food Safety and Quality Control

Theory : 3 Periods / wk (Credits 3)	Theory Marks :-45
Practical :- 4 Periods/wk (Credits 2)	Th.Int.Ass.Mks. :-30
	Practical Marks :- 35
	Pra.Int.Marks :- 15
	Total Marks :- 125

Learning Objectives :- After completion of the course the students will be able to understand-

- (1) importance of quality assurance in food industry.
- (2) various tests and standard for quality assessment and food safety.
- (3) various tests used to detect food adulteration.
- (4) steps to be considered for successful quality control programme.

Course Contents :

Theory :

- Unit-1:** Introduction to quality assurance and food safety assurance. Current concepts of quality control.
- Unit-2:** Quality Assurance Programme :- Quality plan, documentation of records, product standards, product and purchase specifications, process control and HACCP hygiene and housekeeping, corrective action.
- Unit-3:** Quality Costs : Measurement and analysis.
- Unit-4:** Product Evaluation :
- Specifications of food Standards, International, National – Mandatory, Voluntary.
 - Sample preparation.
 - Reporting results and reliability of analysis.

- Tests for specific raw food ingredients and processed foods including additives.
- Proximate principles.
- Nutrient Analysis.
- Quality parameters and tests of adulterants.

Unit-5 : Consumer Protection .:

Practicals :-

Objectives :-

- (1) test different foods for their quality.
- (2) detect adulteration in different foods.
- (3) study the tests used for quality control.

Practicals :-

- (I) Assessment of purity and quality using appropriate standard tests for the following :
 - 1) Water including mineral water.
 - 2) Milk and milk products.
 - 3) Fats and oils including butter, ghee and hydrogenated fat.
 - 4) Icecreams and sherbets.
 - 5) Tea and Coffee
 - 6) Fruit juices, concentrates and beverages.
 - 7) Flesh foods.
 - 8) Cereals and cereal products.
 - 9) Pulses and legumes.
 - 10) Canned dehydrated, frozen and bottled fruit / vegetable product.
- (II) Detection / estimation of food additives and contaminants.

References :-

- (1) Pomeranz Y. and Meloan C.E. (1996), Food Analysis :- Theory and Practice, CBS Publishers and Distributors, New Delhi.
- (2) Ranganna, S. (1986), Handbook of analysis and Quality.

Semester-III

232ELIII59 : Elective-III

Subject Code : 232ELIII.1

Dietetic Techniques & Patient Counseling

Theory : 3 Periods / wk (Credits 3)	Theory Marks :-45
Practical :- 4 Periods/wk (Credits 2)	Th.Int.Ass.Mks. :-30
	Practical Marks :- 35
	Pra.Int.Marks :- 15
	Total Marks :- 125

Learning Objectives :- This course will enable the students to-

- (1) critically appraise, plan and organize / supervise preparation and service of different kinds of therapeutic diets in hospital dietary service.
- (2) develop Skills for patient counseling.
- (3) interact effectively with patients and their families and to give dietary advice in the context of the patients socio-cultural and economic milieu.

Course Contents :

Theory :

- Unit-1 :** 1.1 Dietician as part of the medical team and out reach services.
1.2 Medical History assessment – techniques of obtaining relevant information for patient.
- Unit-2:** Dietary diagnosis and tests for nutritional status – correlation, clinical and dietary information.
- Unit-3:** Patient Education and Counseling – Assessment of patient needs, establishing report, counseling relationship.
- Unit-4 :** Resources and aids of counseling.
- Unit-5 :** Aesthetic attributes of diets..
Follow up visits and patient education.

Practical :- Practical should be based in hospitals and done on the basis of case studies observation and evaluation.

- (1) Appraisal of routine hospital diets and dietary units.
Organizational structure and staffing pattern, number of patients, departments and types of diets, cost and nutritional adequacy, time schedule, service protocol, equipment.

- (2) Case studies and counseling for special diets and feeding methods : Dialysis patient, renal transplant patients, tube feeds, jejunostomy, burns, TPN, Post surgical, Cardiac bypass surgery, hypertension, CHD, post heart attack, liver cirrhosis.
- (3) Children's Diet – Management of sick child – case studies, juvenile – Diabetes, children's diseases, cleft palate, etc. integrating special and specific needs of a sick child with management of routine hospital diets.
- (4) Metabolic disorders including inborn errors of metabolism, IDDM, NIDDM.

References :-

- (1) ARA Health Care Nutrition Counselor : Strategies for results, controlling the pace of counseling (1988), Philadelphia, ARA Services.
- (2) Raab C. and Jillotson, J. (1983), Heart to Heart – A Manual on Nutrition Counseling for the reduction of cardiovascular disease risk factors, U.S. Govt. Printing Office, Washington DC.
- (3) Journal of American Dietetics Association.
- (4) Dryden, W. Counseling individuals. The rational emotive approach, Taylor and Francis. London.
- (5) Dave, Indu (1984) : The basic essentials of Counseling, A Manual Sterling Publishers, New Delhi.

Semester-III

232ELIII59 : Elective-III

Subject Code : 232ELIII.2

Community Nutrition

Theory : 3 Periods / wk (Credits 3)	Theory Marks	: 45
Practical :- 4 Periods/wk (Credits 2)	Th.Int.Ass.Mks.	: 30
	Practical Marks	: 35
	Pra.Int.Marks	: 15
	Total Marks	: 125

Learning Objectives :- After completion of the course the students will be able to-

- (1) understand the causes / determinants and consequences of nutrition problems in society.
- (2) familiar with various approaches to nutrition and health interventions, programmes and policies.

Course Contents :

Theory :

- Unit-1 :** 1.1 Understanding the terms nutrition, health and community nutrition.
- Concept and Definition.
 - Scope.
- 1.2 Health Care :
- Concept of Health Care.
 - Levels of Health Care.
 - Primary Health Care.
 - Health Care Delivery.
- Unit-2 :** 2.1 Nutrition Problems :
- PEM
 - Vitamin A deficiency
 - Iron deficiency Anemia (IDA)
 - Iodine deficiency disorder (IDD)
 - Zinc deficiency
- 2.2 Strategies to combat public nutrition problems
- Unit-3 :** 3.1 Nutrition Problems :
- Vitamin Deficiencies
 - Beriberi
 - Ariboflavinosis
 - Pellagra
 - Folic acid and B₁₂ deficiency
 - Scurvy
 - Rickets and osteomalacia
- 3.2 Strategies to overcome above said problems.
- 3.3 Fluoresis, lathyrism.
- Unit-4 :** 4.1 Food and Nutritional Security :-
- Understanding the concept of food and nutrition security.
 - Determinants of food security.
 - India's food security system.
- 4.2 National Food and Nutrition Policy

Unit-5 : Nutrition Education :

- 5.1 Need, scope, importance, theories.
- 5.2 Process of nutrition education.
- 5.3 Nutrition education communication.
Programme, formulation, implementation and evaluation.

Practical :-

- (1) Identify nutritional problems and strategies to tackle the nutritional problems in vulnerable groups.
- (2) Plan, implement and evaluate nutrition education programme.
- (3) Messages for nutrition and health education
- (4) Development of low cost nutritious recipes suitable for various vulnerable groups.

References :-

- (1) Park K. (2000), Park's Text Book of Preventive and Social Medicine, 18th Edition, M/S Banarasidas Bhanot Jabalpur.
- (2) National Nutrition Policy (1993), Deptt. of WCD, Govt. of India.
- (3) Sharma S.C. (1987), Media Communication and Development, Jaipur.
- (4) Singhal A. and Rogers Everett, M. (1989) : India's Information Revolution, New Delhi, Sage Publications.
- (5) Melkote S.R. (1991) : Communication for Development in the third world : Theory and Practice, New Delhi, Sage.

Semester-III**232ELIII59 : Elective-III****Subject Code : 232ELIII.3****Food Service Management**

Theory : 3 Periods / wk (Credits 3)	Theory Marks :-45
Practical :- 4 Periods/wk (Credits 2)	Th.Int.Ass.Mks. :-30
	Practical Marks :- 35
	Pra.Int.Marks :- 15
	Total Marks :- 125

Learning Objectives :- After completion of the course the students will be able to-

- (1) gain knowledge about the food services in India.
- (2) understand the special characteristics of food service establishment.

- (3) know the types of resources required for managing food outlets.
- (4) Learn man power management techniques.
- (5) know the types of costs involved and how to control them.
- (6) think of starting food service.

Course Contents :**Theory :**

- Unit-1:** Introduction of food service institutions. Importance and meaning of food service institution. Characteristics of food service establishments. Development of food service institutions in India.
- Unit-2:** Food Service Management : Definition, principles and tools of management.
- Unit-3:** Approaches to Management :- Traditional management, systems approach, management by objectives, total quality management.
- Unit-4:** Personnel Management : Recruitments, selection and induction, employee benefits, trade union negotiation and settlement.
- Unit-5:** Cost and Management Accounting : Definition and scope, costs and their control.

Practical :-

- (1) Survey of various types of food services and determine the factors which led to their development.
- (2) Manage small food service unit.

References :-

- (1) Drucker, P.F. (1975), Management, Allied Publishers, New Delhi.
- (2) Sethi, M.; Malhan S. (1993), Catering Management, An integrated approach, Wiley Eastern, New Delhi.
- (3) Hitchcock, M.J. (1980) : Food Service System Administration, Macmillan, New York.

Semester-IV
Subject Code : 242FI60
Food Informatics

Theory : 3 Periods/wk (Credits 3)	Theory marks	-45
Practical : 4 Periods/wk (Credits 2)	Theory internal marks	-30
	Practical internal marks	-50
	Total	-125

Objective - To develop skill in data base management.

Course Contents

Theory :

- Unit 1 :** 1.1 Food Informatics.
 1.2 Meaning and purpose
 1.3 Areas of Food Science and Nutrition.
- Unit 2 :** 2.1 Important search engines.
 2.2 Data bases in Food Science, Nutrition (Clinical nutrition, community nutrition, Human Nutrition), Dietetics, Institutional food service management. Food processing technology.
- Unit 3:** Data collection, organization in areas of food and nutrition.
- Unit 4:** Data storage and distribution by using various information technology tools and methods.
- Unit 5:** Database management system.
 Application of software.

Practicals :-

- (1) Study of various databases in the subject.
- (2) Data searching
- (3) Data Retrieval.
- (4) Create data with the help of software.

References :-

- (1) www.wikipedia.org
- (2) www.google.com
- (3) www.khoj.com
- (4) www.nutra.hub.com
- (5) www.wiley.com
- (6) www.inflibnet.ac.in
- (7) www.pubmed.com

Semester-IV
Subject Code : 242CI61
Current Issues in Food & Nutrition

Theory : 3 Periods / wk (Credits 3)	Theory Marks :-45
Practical :- 4 Periods/wk (Credits 2)	Th.Int.Ass.Mks. :-30
	Pra.Int.Marks :- 50
	Total Marks :- 125

Learning Objectives :-

- (1) To sensitize students regarding current trends, issues and research in various aspects of Food Science and Nutrition.
- (2) To debate on various emerging areas in Food Science and Nutrition.

Course Contents :

Theory :

- Unit-1 :** 1.1 Researches and current issues in food and nutritional requirements of people of developed and developing countries.
 1.2 Special nutritional requirement in emergencies and extreme environments.
- Unit-2 :** 2.1 Nutritional Regulation of gene expression.
 2.2 Researches in genetically modified foods.
- Unit-3 :** 3.1 Current trends in special feeding methods in different disease conditions.
 3.2 Functional foods.
 3.3 Holistic approach in treatment of diseases.
- Unit-4 :** 4.1 Current food processing technologies.
 4.2 Food safety and quality control.
 4.3 Food additives.
- Unit-5 :** 5.1 Non-nutritional components in foods.
 5.2 Food Toxins.

Practical :-

- (1) Discuss various current trends and issues given in theory by seminars, group and panel discussions.
- (2) Prepare food pyramids (for population of developing and developed countries).

- (3) Collect information of GM food and functional foods and prepare educational material.
- (4) Study nutritional supplements and nutritional support substrates available in the market and use in the hospitals for feeding purpose.
- (5) Study nutrition information of foods.
- (6) Study the food additives used in commercial food products.
- (7) Visit to food and drug department to understand requirements of food quality.

Reference :-

- (1) ICMR (1990) : Nutritional Requirement and Recommended Dietary Allowances for Indians, NIN, Hyderabad.
- (2) Mehtab Bamji et al (1996) : Human Nutrition.
- (3) Mohan L.K. and Escott Stump, S. (2000), Krause's Food Nutrition and Diet Therapy, W.B.Saunders Ltd.
- (4) Present Knowledge in Nutrition. ILSI Press 2001.
- (5) Thompson L.U. (1993) Potential Health Benefits and Problems associated with antinutrients in foods. Food Research International. 26: 134-149.
- (6) Whitney E.R. and S.R.Rolfes (2002), Understanding Nutrition, 9th Ed., Wadsworth Thomson Learning, Australia.
- (7) Wardlaw G.M. and Insel PM. Perspectives in Nutrition, Third Edition, Mosby 1996.
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Semester-IV
Subject Code : 242SW62
Scientific Writing

Theory : 3 Periods/Wk (Credits 3)	Theory marks	-45
Practical : 4 Periods/Wk (Credits 2)	Theory internal marks	-30
	Practical internal marks	-50
	Total -	-125

Objective - After completion of course students will be able to understand national / international standards of scientific writing and develop skill of writing research reports.

Course Contents :

Theory :

Unit 1 : Introduction to Scientific Writing

- 1.1 Meaning, definition
- 1.2 Characteristics and Principles
- 1.3 Types of report
- 1.4 Format of report
- 1.5 National and international standards
- 1.6 Lay out of thesis / dissertation :-
Preliminaries, Text, End Matter

Unit 2 : **Writing preliminaries**

- 2.1 Title page, Title of dissertation / thesis.
- 2.2 Certificates : Declaration by students certificate of guide
- 2.3 Acknowledgement
- 2.4 Table of content - list of Table, list of Figure
- 2.5 Glossary / Abbreviation / Acronym

Unit 3 : **Writing Text / Main Body**

- 3.1 Writing introduction
- 3.2 Writing Review of Literature
- 3.3 Writing Methodology Material and Methods
- 3.4 Writing Results
- 3.5 Writing Discussion
- 3.6 Writing Summary, Conclusion and Implication

Unit 4: **Writing End Matter**

- 4.1 Writing References / Literature cited
 - Books
 - Journal / Periodical

- Websites
- Magazines, newspaper

4.2 Appendices

Unit 5 : General Guidelines

- 5.1
- Size of paper, margin, font type and size
 - Headings and Subheadings
 - Number of chapters and pagination
 - Punctuations.
- 5.2 Evaluating structure of dissertation / thesis

Practicals :

1. Use of Library -

Get acquainted with the-

- Type of Library (Traditional, modern, digital, virtual)
- Services provided by Libraries
- Various sources (Printed and electronic)
- Technical work (classification, cataloguing)
- Information retrieval (i.e. OPAC, WEBOPAC, SOUL, Library Portal, e-books etc.)

2. Practice of writing references on reference cards and notes on note cards from different sources.

3. Review, understand and critically evaluate.

- Thesis
- Dissertation
- Abstract

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