SAURASHTRA UNIVERSITY

RAJKOT

(ACCREDITED GRADE "A" BY NAAC)

FACULTY OF HOME SCIENCE

Syllabus for

M.Sc. (HOME SCIENCE FOOD AND NUTRITION)

Choice Based Credit System

With Effect From: 2016-17

Foods and Nutrition

The specialists in Foods and Nutrition play a vital role in promoting the quality of life of individuals and communities, which contributes significantly to the economic and overall development of the nation. This is achieved through a blend of academics, research training and extension as well as industrial applications. The post graduate programme in this discipline has been designed to provide the students with intensive and extensive theoretical and experiential learning. The programme allows flexibility in the choice of thrust areas, which students can select, based on their career goals. It is envisaged that the current scenario at the regional and national level require trained professionals in areas such **Food processing and Technology**, F**ood analysis**, **Clinical and Therapeutic Nutrition, Institutional Food Administration, Food Science, Food Safety, Food Toxicology and Quality Control.**

of the Programme

PG Programme outcomes

PO1: Comprehending and updating knowledge in the core specialized and elective subjects with appropriate practical inputs.

PO2: Gain inter and multidisciplinary and professional competence as value and ethical additions.

PO3: Established ethical entrepreneur through projects field trip industrial visit and other programmes.

PO4:Exhibit attitude skills and knowledge of a well groomed individuals working in the society.

PO5: Impart healthy living skills such as problem solving, decision making, communication etc.

PO6:Explore research interest with creativity, updated technology and sensitivity towards various social issues.

PO7: Enable to pursue higher education and research.

Proggramme Specific Outcomes (PSO)

PSO1: Understand the role of food and nutrition for the welfare of the community.

PSO2: Develop analytical skills in food industry

PSO3: Apply knowledge in the field of community nutrition.

PSO4: Develop competency to make their careers in academics, health care and government and NGOs.

PSO5: Acquire skills to establish a food service unit.

PSO6: Analyze nutrients, food quality and manage diseases using diet therapy.

PSO7: Enable to pursue higher education and research.

PSO8: Gain knowledge to develop entrepreneurial skills.

PSO9: As foods and nutrition are the basic requirement of human life students learn Wright from food groups to sources requirements, physiological functions biochemical as well as metabolic functions.

Eligibility for Admission

The candidates should have completed Food and Nutrition/ General Home Science/ Home Management at B.Sc. level with a minimum percentage of marks decided by the University time to time.

Note: It is a full time degree course and therefore cannot run part time or as external. The contact hour is minimum five hours including practical should be given to the student if it is run by the P. G. Department or any other centre. A total of 96 credits have to be taken by the students to complete the programme. If the number of credits exceeds 96, it permissible, but the calculation of the grade point average will be done on the basis of 96 credits only.

DURATION OF THE COURSE

Two years Courses: The duration of the course is for two academic years consisting of four semesters.

EXAMINATIONS

There shall be four semester examinations: first semester examinations at the middle of the first academic year and the second semester examination at the end of the first academic year. Similarly, the third and fourth semester examinations shall be held at the middle and the end of the second academic year, respectively. The courses are divided into two parts among one is internal consists of 30 marks for core, skill oriented and multidisciplinary courses and 15 marks for elective courses and external consists of 70 marks for core, skill oriented and multidisciplinary courses and 35 marks for elective courses. Internal marks are further divided into three parts among one is MCQ test of 10 marks for CC, MD and SO while 5 marks for elective which is conducted during middle and end of each semester and average of two is consider as a final score. 10 mark of assignment for CC, MD and SO while 5 marks for elective.

10 mark of seminar for CC, MD and SO while 5 marks for elective. Course contain practical works is exempted from seminar.

PATTERN OF QUESTION PAPER: For theory

For 4 credit course, question paper will be of 2.5 hours duration.

Question paper will contain total six questions.

Question No-1 or Question No. 1 will be compulsory and objective type.

Students will have to attempt any three questions from the rest of the questions.

All Questions will carry equal grades.

For 2 credit course, question paper will be of 1.5 hours duration.

Question paper will contain total four questions.

Question No-1 or Question No. 1 will be compulsory and objective type.

Students will have to attempt any two questions from the rest of the questions.

All Questions will carry equal grades.

For practical

For practical examination a skeleton will be designed and given to examiner every year. The duration will be of five hours. Passing standard is 40 %.

EVALUATION

The seven grade point scale starting from 'O' to 'F' will be formed for evaluation of theories and Practicals.

The student will be required to obtain at least 'C' grade (i.e. minimum of 2.6 grade points) in individual theories and practical for passing. For passing theories and practicals should be considered separately.

Before getting the final average grade point (AGP), the student will have to clear all theory and practical subjects i.e. at least 2.6 grade points in each theory and practicals.

For calculating the semester grade point, the average of grade of each theory subject and each practical subject will be considered. The final semester grade will be given on the basis of obtained grade points as per the scale.

For calculating the final grade point at the end of four semesters, the average of semester grade points will be considered. The final grade will be given on the basis of obtained final grade point as per the scale.

- The grade point scale is as follows :

Sr. No.	Grade	Scale
1	O-Outstanding	5.6 – 6.0
2	A-Very Good	4.6 – 5.5
3	B-Good	3.6 – 4.5
4	C-Average	2.6 – 3.5
5	D-Fair	1.6 – 2.5
6	E-Poor	0.6 – 1.5
7	F-Very poor	0.0 – 0.5

- For calculating average percentage the average grade point should be multiplied by 16.67.
- Dissertation must be in English Language only.

Blue print of M.Sc. Foods & Nutrition Programme

Semester-1: Foods & Nutrition

Course Code	Title of The Course	CC	CCr	WH	IM	EM	TM
16081202010100	Research Methods	MD	04	04	30	70	100
16080102010200	Advanced Nutritional Biochemistry	Core	04	04	30	70	100
16080102010200 (P)	Advanced Nutritional Biochemistry (Pra)		02	04	---	50	50
16080102010300	Methods of Investigation	SO	04	04	30	70	100
16080102010300 (P)	Methods of Investigation (Pra)		02	04	---	50	50
16080102010401	Geriatric Nutrition	EL (Any one)	02	02	15	35	50
16080102010402	Public Health Nutrition						
16080102010403	Food Packaging						
16081202010500	Clinical and Therapeutic Nutrition	Core	04	04	30	70	100
16081202010500 (P)	Clinical and Therapeutic Nutrition (Pra)		02	04	---	50	50
	Total		24	30	135	465	600

CC=Course Category, CCr= Course Credit, WH= Working Hours, IM=Internal Marks, EM =External Marks, TM=Total Marks, Course revision year=16, Faculty code=08, Subject code,= 01 for Foods & Nutrition, 02 for General Home Science and 12 for common for both, Level=02 (PG), Sem=01-04, Paper no= 01-05, Options 00 for Core, Multidisciplinary (MD), and Skill oriented (SO), for Elective =01-05 (EL)

(Interpretation of code 16081202010100 Here 16 means 2016, 08 Home science faculty, 12 means this paper is common for foods & nutrition and general home science, 02 means PG level, 01 Semester I , again 01 is paper no and last 00 is for Multidisciplinary course.**)**

Semester-II: Foods & Nutrition

Course Code	Title of The Course	CC	CCr	WH	IM	EM	TM
16080102020100	Maternal and Child Nutrition	Core	04	04	30	70	100
16080102020200	Advanced Nutrition - I	Core	04	04	30	70	100
16080102020200(P)	Advanced Nutrition – I (Pra)		02	04	---	50	50
16081202020300	Food Science	Core	04	04	30	70	100
16080102020300 (P)	Food Science (Pra)		02	04	---	50	50
16081202020401	Nutrition for Health and Fitness	EL (Any one)	02	02	15	35	50
16080102020402	Nutritional Epidemiology						
16080102020403	Food product development and Marketing						
16081202020500	Statistics	SO	04	04	30	70	100
16081202020500 (P)	Computer Application (Pra)		02	04	---	50	50
	Total		24	30	135	465	600

CC=Course Category, CCr= Course Credit, WH= Working Hours, IM=Internal Marks, EM =External Marks, TM=Total Marks, Course revision year=16, Faculty code=08, Subject code,= 01 for Foods & Nutrition, 02 for General Home Science and 12 for common for both, Level=02 (PG), Sem=01-04, Paper no= 01-05, Options 00 for Core, Multidisciplinary (MD), and Skill oriented (SO), for Elective =01-05 (EL)

(Interpretation of code 16080102020100 Here 16 means 2016, 08 Home science faculty, 01 means foods & nutrition, 02 means PG level, 02 Semester II , again 01 is paper no and last 00 is for Core course.**)**

Semester-III: Foods & Nutrition

Course Code	Title of The Course	CC	CCr	WH	IM	EM	TM
16080102030100	Institutional Food Administration	Core	04	04	30	70	100
16080102030100 (P)	Institutional Food Administration (Pra)		02	04	--	50	50
16080102030200	Advanced Food Microbiology	Core	04	04	30	70	100
16080102030200 (P)	Advanced Food Microbiology (Pra)		02	04	---	50	50
16080102030300	Advanced Human Physiology	Core	04	04	30	70	100
16080102030300(P)	Instrumentation for Food Analysis (Pra)		02	04	---	50	50
16081202030401	Dietetic techniques and patient counseling	EL (Any one)	02	02	15	35	50
16080102030402	Management of Nutrition programme						
16080102030403	Food Toxicology						
16081202030500	Scientific Writing	SO	04	04	30	70	100
	Total		24	30	135	465	600

CC=Course Category, CCr= Course Credit, WH= Working Hours, IM=Internal Marks, EM =External Marks, TM=Total Marks, Course revision year=16, Faculty code=08, Subject code,= 01 for Foods & Nutrition, 02 for General Home Science and 12 for common for both, Level=02 (PG), Sem=01-04, Paper no= 01-05, Options 00 for Core, Multidisciplinary (MD), and Skill oriented (SO), for Elective =01-05 (EL)

(Interpretation of code 16080102030100 Here 16 means 2016, 08 Home science faculty, 01 means foods & nutrition, 02 means PG level, 03 Semester III , again 01 is paper no and last 00 is for Core course.**)**

Semester-IV: Foods & Nutrition

Course Code	Title of The Course	CC	CCr	WH	IM	EM	TM
16080102040100	Food Processing and Technology	Core	04	04	30	70	100
16080102040100 (P)	Food Processing and Technology (Pra)		02	04	---	50	50
16080102040200	Advanced Nutrition – II	Core	04	04	30	70	100
16080102040300	Food Safety and Quality Control	Core	04	04	30	70	100
16080102040300(P)	Food Safety and Quality Control (Pra)		02	04	---	50	50
16080102040401	Nutrition in Critical Care	EL (Any one)	02	02	15	35	50
16080102040402	Current Trends in Public Nutrition						
16080102040403	Current Trends in Foods & Nutrition						
16081202040500	Assessment of Nutritional Status	SO	04	04	30	70	100
16081202040500(P)	Assessment of Nutritional Status (Pra)		02	04	--	50	50
16081202040500(D)	Dissertation Of 150 marks instead of 16081202040500 and 16081202040500(P)	----	----	---	--	50 for Viva-voce 100 Report	150
	Total		24	30	135	465	600

CC=Course Category, CCr= Course Credit, WH= Working Hours, IM=Internal Marks, EM =External Marks, TM=Total Marks, Course revision year=16, Faculty code=08, Subject code,= 01 for Foods & Nutrition, 02 for General Home Science and 12 for common for both, Level=02 (PG), Sem=01-04, Paper no= 01-05, Options 00 for Core, Multidisciplinary (MD), and Skill oriented (SO), for Elective =01-05 (EL)

(Interpretation of code 16080102040100 Here 16 means 2016, 08 Home science faculty, 01 means foods & nutrition, 02 means PG level, 04 Semester IV , again 01 is paper no and last 00 is for Core course.**)**

Guideline for Students to select Elective subjects for building their carrier in the field in which they want to built

List of Elective Subjects in M. Sc. Foods & Nutrition Programme

Semester	Foods & Nutrition		
	Related to Food Technology	Related to Public Nutrition	Related to Dietetics
I	Food Packaging,	Public Health Nutrition	Geriatric Nutrition
II	Food product development and Marketing	Nutritional Epidemiology	Nutrition for Health and Fitness
III	Food Toxicology	Management of Nutrition programme	Dietetic techniques and patient counseling
IV	Current Trends in Foods & Nutrition	Current Trends in Public Nutrition	Nutrition in Critical Care

Detail Syllabus of M.Sc. Home Science

Foods and Nutrition

(Syllabus format on CBCS: June-2016)

Semester-1: Foods & Nutrition

Course Code	Title of The Course	CC	CCr	WH	IM	EM	TM
16081202010100	Research Methods	MD	04	04	30	70	100
16080102010200	Advanced Nutritional Biochemistry	Core	04	04	30	70	100
16080102010200 (P)	Advanced Nutritional Biochemistry (Pra)		02	04	---	50	50
16080102010300	Methods of Investigation	SO	04	04	30	70	100
16080102010300 (P)	Methods of Investigation (Pra)		02	04	---	50	50
16080102010401	Geriatric Nutrition	EL (Any one)	02	02	15	35	50
16080102010402	Public Health Nutrition						
16080102010403	Food Packaging						
16081202010500	Clinical And Nutrition And Dietetics	Core	04	04	30	70	100
16081202010500 (P)	Clinical And Nutrition And Dietetics(Pra)		02	04	---	50	50
	Total		24	30	135	465	600

CC=Course Category, CCr= Course Credit, WH= Working Hours, IM=Internal Marks, EM =External Marks, TM=Total Marks, Course revision year=16, Faculty code=08, Subject code,= 01 for Foods & Nutrition, 02 for General Home Science and 12 for common for both, Level=02 (PG), Sem=01-04, Paper no= 01-05, Options 00 for Core, Multidisciplinary (MD), and Skill oriented (SO), for Elective =01-05 (EL)

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SEMESTER – I

FOODS & NUTRITION

PAPER-1

Course Code: 16081202010100 **Course Category: Multi-disciplinary**

Course Title: RESEARCH METHODS

Credit: 04 **Contact hour/week=04**

Course Outcome

CO1: To understand the significance of statistics and research methodology in Home Science research

CO2: To understand the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.

CO3: To understand an

CO4:To apply the appropriate statistical technique for the measurement scale and design.

Unit I: Research- Meaning, purpose and approaches

- Exploration, Description, Explanation
- Scientific method and research
- Research Designs –Experimental and Observational
- Quantitative and Qualitative approaches
- Conceptualization and Measurement Variables, concepts and measurement
- Levels of measurement
- Units of analysis

Unit II: Sampling & Tools

- Role of sampling in research
- Types of sampling
- Research Tools and Techniques Validity and reliability
- Interviewing and observational methods

Unit III: The Research Process

- Defining the problem, research questions, objectives, hypotheses
- Review of related literature and originality in writing
- Planning the research

- Subjects context and ethics
- Methodology and tools
- Citation formats: in medical sciences, social sciences
- Unit III:

Unit IV: Types of Research Tools (Qualitative and Quantitative)

- Quantitative research tools
- Qualitative research tools
- Focus Group Discussion
- Case studies
- Observations-Direct, Spot observations
- Body mapping
- Pile sorting
- Free listing
- Narrations
- In depth interview
- Drawing as dialogue

Unit V: Representation of Data

- Graphical and Diagrammatic Presentation of Data (Bar diagrams, Pie-diagram, Histogram, Frequency Polygon, Smoothed frequency curve and Ogives)
- Tabulation and Classification
- Frequency Distribution

Unit V I: Ethics and Politics of Research

- Identify, define, and analyze ethical issues in the context of human subject research.
- Reasons for conducting ethical review of research, theories and concepts related to ethical decision-making including consequentialism, deontology, respect, dignity, discourse ethics, communitarianism, liberalism and the four principles approach.
- Ethical importance of consent, privacy and confidentiality in research
- Issues of academic fraud and plagiarism, conflicts of interest, authorship and publication

RECOMMENDED READINGS

- Agrawal C. , Joshi S.P. and Sinha A. : Communication Research and development,The ISRO Experience, new Delhi, Nawray Rai concept Pub. Co.
- Beaglchole R, Bonita R and Kjellstrom T (1993). Basic Epidemiology. World Health Organization, Geneva.
- Best J. (1959) : Research in education. Englewood, Cliffs. New Jercy Prentice Hall Inc.
- Bhattacharya DK (2004). Research Methodology. Published by Anurag Jain for excel books, New Delhi, India
- Biderman A. and Drury T. (1976) : Measuring work and Quality for social reporting New York, John Willy and Sons.
- Brow F. (1988) : Statistics for Behavioural Science, Bostan, Allyn and Barm Inc. Centry Gofes

  Company, Inc. New York.

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  Design, Prentice Hale Inc. N.J.
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- God V. Caiter (1972) : Essentials of Educations Research Methodology and
- Good C.N. (1963) : Introduction to Educational research, New York, Applatan
- Gupta S.C. and Kapodi V.R. (1990) : Fundamentals of Applied Statistics, New
- Hinton P (2004). Statistics Explained: A Guide for Social Science Students. Routledge Publishing, London
- Kaul L. (1980) : Methodology of Educational Research, Vani educational books, Vikas Pub., New Delhi.
- Keennetb King. (1978) : Final report Literacy Research in developing countries -
- Kerlinger F.n. (1965) : Foundations of Behavioural Research, N.., Holl Rinehart and Winston Inc.
- Kothari C R (2008). Research Methodology: Methods and Techniques (2nd ed.). New Age International Publishers, New Delhi, India.

  Ltd., Ramnagar, Delhi.
- Methodology of Research in Education – Publishing Sidhu Sterling Publishers Pvt.Ltd. New Delhi.

- Monly C.J. (1964) : Tre Science of Educational Research, Einasia Pub. House New Delhi.
- Patton Q.M. (1990) : Qualitative evaluation and Research methods, sage Pub.,
- Ratnapala N. (1993) : New Horizons in Research methodology, Sri Lanka,
- Rolvert horndike (1977) : Measurement & Evaluation in Psychology & Education.4th ed. John Willy & Sons

Sarvodaya Research Institute.

Sciences, Tata McGraw Hill Pub. Co. Ltd., New Delhi.

- Singh A.K. (1986) : Tests, Measurement and Research Methods in Behavioral
- Sproull N (2003). Handbook of Social Research Methods: A Guide for Practitioners and Students in the Social Sciences. The Scarecrow Press, Inc., New Jersey
- Wandt Edwin (1968) : A cross section of educational Research, David Mckay

workshop on education research with special research on literacy. Geneva

Course Code: 16080102010200 **Course Category: Core**

Course Title: ADVANCED NUTRITIONAL BIOCHEMISTRY

Credit: 04 **Contact hour/week=04**

Course Outcome

This course will enable the students to:

CO1: Augment the biochemistry knowledge acquired and at the undergraduate level

CO2:Understand the mechanisms adopted by the human body for regulation of metabolic Pathways

CO3: Get an insight into interrelationships between various metabolic pathways

CO4: Become proficient for specialization in nutrition.

CO5:Understand integration of cellular level metabolic events to nutritional disorders and imbalances.

Contents

1. **Heteropolysaccharides**: Definition, classification, structure and properties of glycoprotein and proteoglycans.
2. **Plasma Proteins** – Nature, properties and functions
3. **Overview of regulation of intermediary metabolism**: Equilibrium and non-equilibrium reactions, committed steps, allosteric modifications, covalent modulation, cross-over theorem and futile cycles.
4. **Intermediary metabolism**: Reactions, standard free energy changes and regulation.
   - Carbohydrates – glycolysis, gluconeogenesis, citric acid cycle, hexose monophosphate pathway.
   - Lipids, beta-oxidation, de novo synthesis of fatty acids, synthesis and breakdown of unsaturated fatty acids, cholesterol, phospholipids and triacylglycerol
5. **Purines and Pyrimidines** – Synthesis and breakdown.
6. **Nucleic acids** – DNA replication and transcription, DNA repair systems, DNA recombinant Genetic mutation, regulation of gene expression and protein biosynthesis.
7. **Hormones** – Mechanism of action of hormones.

Course Code: 16080102010200 P **Course Category: Core**

Course Title: ADVANCED NUTRITIONAL BIOCHEMISTRY Practical

Credit: 02 **Contact hour/week=04**

Course Outcome

This course will enable the students to:

CO1: Understand the principles of biochemical methods used for analysis of food and biological samples

CO2: Perform biochemical analysis with accuracy and reproducibility.

1. Calcium : Estimation of calcium in foods and serum.
2. Phosphorus: Estimation of inorganic phosphorus in foods and serum.
3. Ascorbic acid: Estimation of ascorbic acid in foods.
4. Proteins :
   a. Estimation of protein in food stuffs.
   b. Estimation of albumin, globulin and albumin / globulin ratio in serum and urine.
   c. Estimation of hemoglobin
5. Glucose: Estimation of glucose in blood and urine.
6. Cholesterol: Estimation of cholesterol in blood
7. Enzyme assay: Estimation of activity of serum alkaline phosphatase and transaminase
8. Urea and Creatinine: Estimation of urea and creatine in serum and urine.
9. Survey of pathological laboratories: To obtain information about the methods used for blood / serum analysis.

References:

1. Murray, R.K. Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000): 25* Ed. Harpers Biochemistry, Macmillan worth Publishers.
2. Nelson, D.L. and Cox, M.M. (2000): 3rd Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.
3. Devlin, T.M. (1997): 4th Ed. Text book of Biochemistry with Clinical Correlations, Wiley Liss Inc.

4. Stryer, L. (1998): 4th Ed. Biochemistry, WH Freeman and Co.,
5. Conn, E.E., Stumpf, P.K., Bruening, G. and Doi, R.H. (2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.
6. Voet, D. Voet, J.G. and Pratt, C.W. (1999). Fundamentals of Biochemistry.
7. Oser, B.L. (1965). 14th Ed. Hawk's Physiological Chemistry. Tata McGraw-Hill Publishing Co. Ltd.
8. Varley, H. Gowenlock, A.H. and Bell, M.(1980). 5th Ed. Practical Clinical Biochemistry, Heinemann Medical Books Ltd.,
9. Tietz, N.W.: (1976) Fundamentals of Clinical Chemistry. S.B. Saunders Co.,
10. Vogel, A.I. (1962): 3rd Ed. A. Textbook of Quantitative Inorganic Analysis. The English Language book Society and Longman
11. Raghuramulu, N : Madhavan nair and K. Kalyanasundaram, S. (1983). A Manual of Laboratory Techniques NIN, ICMR.
12. Plummer, D. T. (1987). 3rd Ed. An Introduction to Practical Biochemistry McGraw-Hilol Book Co.,
13. Winton, A.L. and Winton, K.B. (1999). Techniques of Food Analysis. Allied Scientific Publishers.

Course Code: 16080102010300 **Course Category**: **Skill Oriented**

Course Title: Methods of Investigation

Credit: 04 **Contact hour/week=04**

Course Outcome

This course will enable the students to:

CO1: To understand the principles of various analytical techniques available for nutrition research.

CO2: To familiarize with the applications of the above techniques.

Contents

1. **Introduction to method of analysis**: volumetric analysis, standard substance and solutions, calibration of glassware, standardization of solutions with examples.
2. **Electrolytic dissociation:** Acids, bases, salts, buffers, Henderson – Hasselbach equation. Theory of indicators and principles of measurement of pH
3. **Basics of Instrumentation:** Physico-chemical principles and methodology: colorimetry, photometry, fluorimetry, flame photometry and atomic absorptiometry.
4. **Chromatography:** Principles and application in paper (circular, ascending and descending), ion-exchange, column, thin layer, gas liquid and high performance liquid chromatographic techniques.
5. **Electrophoresis**: Principle and applications in paper and gel electrophoresis.
6. **NMR and its application**.
7. **Immunological Methods:** RIA, ELISA.

Course Code: 16080102010300P **Course Category**: **Skill Oriented**

METHODS OF INVESTIGATION Practical

Credit: 02 **Contact hour/week=04**

This course will enable the students to:

1. Orient them regarding the use of various analytical techniques for specific estimation.
2. Comprehend better the principles involved in different methods of investigation.
3. Become efficient in the use of some of the most commonly used techniques and instruments in High quality research.

1. **Acid and Alkalis**: Preparation of dilute solutions of common acids and alkalis and determining their exact normalities.
2. **Buffers**: Preparation of phosphate, carbonate-bicarbonate, boric acid, acetate, chloride and phthalate buffers and determination of their pH by the use of indicators and pH meters.
3. **Spectrometry:** Beer Lambert law, absorption maximum, preparation of standard curve and nutrient estimations in UV and visible range, AAS, AES, Flamephotometry.
4. **Fluorimetry** : Estimation of thiamin and riboflavin.
5. **Chromatography**: Paper – identification of amino acid by circular, ascending and descending methods. Ion-exchange-separation of amino acids. Column-Separation of proteins. Thin layer-identification of amino acids. Gas-liquid-Estimation of fatty acids. HPLC-Estimation of β-carotene and α-tocopherol.
6. **Electrophoresis:** Fractionation of plasma proteins.

References

1. Boyer, R. (2000). 3rd Ed. Modern Experimental Biochemistry. Person Education, Asia.

2. Dawes, E.A.(1980)6th Ed. Quantitaative Problems in Biochemistry. Longman Group Ltd.,
3. Khosla, B. D., Garg V. C. and Khosla, A. (1987)_. 5th Ed. Senior Practical Physical Chemistry, R. Chand & Co., New Delhi.
4. Oser, B.L. (1965): 14th Ed. Hawk's Physiological Chemistry. Tata McGraw-Hill Publishing Co. Ltd.,
5. Joshi H D., (2004)' Methods of Analysis, Department of Home Science Saurashtra University, Rajkot.
6. Raghuramulu N.; Madhavan Nair and K. Kalyanasundaram, S. (1983). A Manual of Laboratory Technique. NIN, ICMR.
7. Sharma, B.K. (1999). 8th Ed. Instrumental Methods of Chemical Analysis. Gel Publishing House.
8. Srivastava, A.K. and Jain P. C. (1986) (second edition) Chemical Analysis an instrumental approch. S. chand & co. limited.
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10. Vogel, A.I. (1962) 3rd Ed. A Textbook of Quantitative Inorganic Analysis by The English Language Book Society and Longman.

Course Code: 16080102010401 **Course Category**: **Elective**

Course Title: Geriatric Nutrition

Credit: 02 **Contact hour/week=02**

Course Outcome

The course is designed to:

CO1: Familiarize the students with the multifaceted aspects of ageing.

CO2: Make the students competent for nutritional and health care of the elderly.

Contents

1. The ageing process-physiological, biochemical and body composition changes.
2. Theories of ageing.
3. Socio-psychological aspects of ageing – special problems of elderly women.
4. Nutritional requirements of the elderly and dietary management to meet nutritional needs
5. Chronic degenerative diseases and nutritional problems of the elderly – their etiopathogenesis, management, prevention and control.
6. Policies and programmes of the government and NGO sector pertaining to the elderly.

References

1. Kumar, V. (1996): Aging- Indian Perspective and Global Scenario. Proceedings of International Symposium of Gerontology and Seventh Conference of the Association of Gerontology (India).
2. Bagchi, K. & Puri, S. (Ed.) (1999): Diet and Aging-Exploring Some Facets. Soc. For Gerontological Research, New Delhi and Help Age India, New Delhi

Course Code: 16080102010402 **Course Category: Elective**

Course Title: Public Health Nutrition

Credit: 02 **Contact hour/week=02**

Unit-I

Concept of public nutrition - Relationship between health and nutrition, role of public nutritionists in the health care delivery system.

UNIT -II

Approaches and strategies for improving nutritional status and health - Programmatic options their advantages and demerits. Intervention Programmes Health based interventions, Food based interventions including fortification and genetic improvement of foods, supplementary feeding. Malnutrition and Health economics - Its impact on productivity and national development. Cost management.

UNIT -III

Information Education Communication approaches to improve health and nutrition: Concepts Scope- Elements- Models of communication - Communication Process - Approaches and Barriers to communication, Communication for Extension Education and Development - Introduction to IEC Aims and Objectives, Importance of IEC, relevance to programmes - Nutrition education for behaviour change Rationale, Planning Execution and evaluation - Intervention Programmes Health based interventions, Food based interventions including fortification and genetic improvement of foods, supplementary feeding- Different Media, their characteristics and use- IEC for different target groups.

References

1. Owen, A.Y. and Frankle, R.T. (1986): Nutrition in the Community, The Art of Delivering Services, 2nd Edition Times Mirror/Mosby.
2. Park, K. (2000): Park's Textbook of Preventive and Social Medicine, 18th Edition, M/s. Banarasidas Bhanot, Jabalpur.
3. SCN News, UN ACC/SCN Subcommittee on Nutrition.
4. State of the World's Children, UNICEF.
5. Census Reports.
6. Berg, A. (1973): The Nutrition Factor, the Brookings Institution, Washington.
7. Beaton, G.H. and Bengoa, J.M. (Eds) (1996): Nutrition in Preventive Medicine, WHO.
8. Bamji, M.S., Rao, P.N., Reddy, V. (Eds) (1996): Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
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10. Gopalan, C. and Kaur, S. (Eds) (1993): Towards Better Nutrition, Problems and Policies, Nutrition Foundation of India.
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12. Achaya, K.T. (Ed) (1984): Interfaces between Agriculture Nutrition and Food Science, The United Nations University.
13. National Family Health Survey I & II (1993, 2000): International Institute for Population Studies, Mumbai.
14. National Plan of Action on Nutrition (1995): Food & Nutrition Board, Dept. Of WCD, Govt. of India.
15. National Nutrition Policy (1993): Dept. of WCD, Govt. of India.
16. Nutrition Education for the Public (1997): FAO Food and Nutrition Paper, 62, FAO.
17. Allen, L. and Ahluwalia, N. (1997) Improving Iron Status Through Diet: The Application of Knowledge Correcting Dietary Iron Bioavailability in Human Populations. OMNI/USAID, Arlington, VA, USA
18. Nestel, P. (ed) (1995). Proceedings: Interventions for Child Survival. OMNI/USAID Arlington, VA, USA
19. Documents and Reports published by the International Vitamin A Consultative Group
20. Documents and Reports of the International Nutritional Anemia Consultative Group
21. Howson, C.; Kennedy, E. and Horwirz, A. (eds) (1998). Prevention of Micronutrient Deficiencies: Tools for Policymakers and Public Health Workers. Committee on Micronutrient Deficiencies, Board on International Health, Food and Nutrition Board, National Academy Press, Washington D.C. USA.
22. Micronutrient Initiative (1998) Food Fortification: To End Micronutrient Malnutrition. The Micronutrient Initiative, Ottawa, Canada.

Course Code: 16080102010403 **Course Category: Elective**

Course Title: Food Packaging

Credit: 02 **Contact hour/week=02**

Course Outcome

This Course is designed to enable students to:

CO1: Gain knowledge about various packaging materials and importance of packaging.

CO2: Be familiar with testing and evaluation of packing media.

CO3: Be familiar with packaging laws and regulations.

CO4: Be able to select appropriate packaging material for a variety of food stuffs vis-à-vis the need for preventing environment degradation.

Contents

1. **Introduction to packaging:** Primary packaging media ,Properties and application manufacturing and applications of paper and paperboard, metal, glass, plastics; combined package systems; Labels, caps and closures and adhesives, inks and lacquers, cushioning materials.
2. **Packaging of Food products:** fruits and vegetables; packaging requirements of fresh fruits and vegetables; criteria for selection of proper packaging based on the shelf life desired.
3. **Environmental and safety issues in packaging**: Packaging Laws and regulations, Coding and marking including bar coding; Environmental & Economic issues, recycling and waste disposal.

REFERENCES

1. Sacharow & Grifin, Food packing – AVI Publications.
2. Hotchikess Food & Packaging Interaction – American Chemical Society.
3. Stanley & Sacharow Food Packaging.
4. Darry, R. & T. Blackie: Principles & Applications of MAP Academic & Professions.
5. Bhatia S.C. Canning & Preservations of Fruits & Vegetables, new Delhi, India.
6. Dalzett, J.M. Food Industry & The Environment – Capmann & Hallm London.
7. Robertson, G. L. Food Packaging - New York, Marcell Dekker, INC.

8. Bureau of G & Multon J. K. Food Packaging Technology (Vol. 1 & 2)- VCH, Publishers, INC, New York.
9. Robertson, G.L. Food Packaging: Principles and Practice (2nd ed.), Taylor & Francis 2006
10. Parry R. T. and Blakistone B. A. Principles & Applications of MAP Springer, New York, 1999
11. Food Packaging Technology Handbook. NIIR Board, National Institute of Industrial Research, 2003
12. Ahvenainen, R. (Ed.) Novel Food Packaging Techniques, CRC Press, 2003
13. Han, J.H. (Ed.) Innovations in Food Packaging, Elsevier Academic Press, 2005
14. Coles, R., McDowell, D. and Kirwan, M.J. (Eds.) Food Packaging Technology, CRC Press, 2003

1. .

Course Code: 16080102010500 **Course Category: Core**

Course Title: CLINICAL AND NUTRITION AND DIETETICS

Credit: 04 **Contact hour/week=04**

Course Outcome

This Course will enable students to:

CO1: Understand the etiology, Physiologic and Metabolic Anomalies of acute and chronic diseases and patient needs.

CO2:Know the effect of the various diseases on nutritional status and nutritional and dietary requirements.

CO3: Be able to recommend and provide appropriate nutritional care for prevention / and treatment of the various diseases.

Contents

1. Introduction to medical Nutrition therapy

Introduction

Definitions and role of dietitian in health care

The Nutrition care process(NCP)

Importance of coordinated nutritional and rehabilitation services

Patient care and counseling

2. Adaptation of therapeutic diets

- Introduction
- Therapeutic diets
- Types of dietary adaptations for therapeutic needs
- Normal nutrition: A base of therapeutic diet
- Diet prescription
- Constructing therapeutic diets
- Routine hospital diets
- Mode of feeding

3. Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of :

- Weight imbalances
- Cardio vascular disorders
- Diabetes mellitus and other metabolic disorders.

- GI Tract Disorders
- Liver and gall bladder, Pancreatic disorders
- Renal disorders
- Stress and trauma
- Cancer
- Infection AIDS
- Respiratory problems

Course Code: 16081202010500P **Course Category: Core**

CLINICAL AND NUTRITION AND DIETETICS

Practicals

Credit: 02 **Contact hour/week=04**

1. Market survey of commercial nutritional supplements and nutritional support substrates.
2. Interpretation of patient data and diagnostic tests and drawing up of patient diet prescription, using a case study approach. Follow-up acceptability of diet prescription compliance; discharge diet, plan for cardiovascular disease diabetes. Liver, Renal diseases.
3. Preparation of diet counseling aids for common disorders.
4. Planning and preparation of diets for patients with common multiple disorders and complications and discharge diet plans.

References:

1. Dave, Nilambari (2004). Nutrition and Diet Therapy, 1st Edition, Dr. Nilambari Dave, Head, Dept. of Home Science, Saurashtra University, Rajkot.
2. Mahan, L.K. and Escott-stump S. (2000): Krause's food nutrition and diet therapy, 10th Edition, W.B. Saunders Ltd.,
3. Shills, M.E. Olson, J.A. Shilke, M. and Ross. A.C. (1999). Modern in Health and Disease, 9th Edition, Williams and Wilkins.
4. Escott-Stump, S. (1998) : Nutrition and Diagnosis Related Care, 4th Edition, Williams and Wilkins.
5. Garrow, J.S. James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietitics, 10th Edition, Churohill Livingstone.
6. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition. Times Mirror / Mosby College Publishing.
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9. Guyton, A.C. and Hall, J.E. (1999): Textbook of Medical Physiology, 9th Edition, W.B. Saunders Co.,
10. Ritchie, A.C. (1990): Boyd's textbook of Pathology, 9th Edition, Lea and Febiger, Philadelphia.
11. Fauci, S.A. et al. (1998): Harrison's Principles of Internal Medicine, 14th Edition, McGraw Hill.
12. World Cancer Research Fund (1997): Food, Nutrition and the Prevention of Cancer. A Global perspective Washington, E.D. WCRF.
13. Dave N R,(2004) "Nutrition & Diet Therapy'',Department of Home Science, Saurashtra University .Rajkot.

Journal and Other References Series:

14. Nutrition Update Series
15. World review of nutrition and dietetics.
16. Journal of the American Dietetic Association
17. American Journal of Clinical Nutrition
18. European journal of Clinical Nutrition
19. Nutritional reviews.

Detail Syllabus of M.Sc. Home Science

Foods and Nutrition

(Syllabus format on CBCS: June-2016)

Semester-II: Foods & Nutrition

Course Code	Title of The Course	CC	CCr	WH	IM	EM	TM
16080102020100	Maternal and Child Nutrition	Core	04	04	30	70	100
16080102020200	Advanced Nutrition - I	Core	04	04	30	70	100
16080102020200(P)	Advanced Nutrition – I (Pra)		02	04	---	50	50
16081202020300	Food Science And Tecnology	Core	04	04	30	70	100
16080102020300 (P)	Food Science And Tecnology		02	04	---	50	50
16081202020401	Nutrition for Health and Fitness	EL (Any one)	02	02	15	35	50
16080102020402	Nutritional Epidemiology						
16080102020403	Food product development and Marketing						
16081202020500	Statistics	SO	04	04	30	70	100
16081202020500 (P)	Computer Application (Pra)		02	04	---	50	50
	Total		24	30	135	465	600

CC=Course Category, CCr= Course Credit, WH= Working Hours, IM=Internal Marks, EM =External Marks, TM=Total Marks, Course revision year=16, Faculty code=08, Subject code,= 01 for Foods & Nutrition, 02 for General Home Science and 12 for common for both, Level=02 (PG), Sem=01-04, Paper no= 01-05, Options 00 for Core, Multidisciplinary (MD), and Skill oriented (SO), for Elective =01-05 (EL)

(Interpretation of code 16080102020100 Here 16 means 2016, 08 Home science faculty, 01 means foods & nutrition, 02 means PG level, 02 Semester II , again 01 is paper no and last 00 is for Core course.**)**

Course Code: 16080102020100 **Course Category**: **Core**

Course Title: Maternal & Child Nutrition

Credit: 04 **Contact hour/week=04**

Course Outcome

This course is designed to enable the students to:

CO1:Understand physiological changes in pregnancy and lactation.

CO2: Get acquainted with growth and developmental changes.

CO3: Understand the inter-relationship between nutrition and growth and development during life cycle.

Contents

1. Importance of Maternal Nutrition:
   - Importance of nutrition prior to and during pregnancy.
   - Pre-requisites for successful outcome. Effect of undernutrition on mother and child including pregnancy outcome and Maternal and Child Health – Short term and Long term.
   - Physiology and endocrinology of pregnancy and embryonic and fetal growth and development.
   - Nutritional requirements during pregnancy
   - Adolescent Pregnancy
   - Pregnancy and AIDS
   - Pregnancy and TB
   - Intra-Uterine growth retardation
   - Complications of pregnancy and management and importance of antenatal care.
   - Congenital malformation, fetal alcohol syndrome and gestational diabetes mellitus.
2. Lactation:
   - Development of mammary tissue and role of hormones

- Physiology and endocrinology of lactation – Synthesis of milk components, let down reflex, role of hormones, lactational amenorrhea, and effect of breast feeding of maternal health.
- Human milk composition and factors affecting breastfeeding and fertility
- Management of lactation – Prenatal breastfeeding skill education. Rooming in, problems – sore nipples, engorged breast, inverted nipples etc.
- Exclusive breastfeeding

3. Growth and development during infancy, childhood.

References

1. International Food Policy Research Institute (1997). Care and Nutrition: Concepts and Measurement, International Food Policy Research Institute Washington DC., USA.
2. International Child Health: A Digest of Current Information.
3. Barker, D.J.P. (1998). Mothers, Babies and Health in Later Life. Edinburgh, Churchill Livingstone.
4. Ward, R.H.T; Smith, S.K; Donnai, D. (Eds.) (1994) Early Fetal Growth and Development, London, RCOG Press.
5. Sachdev; H.P.S. and Choudhary, P. (1995). Nutrition in Children – Developing Country Concerns. Cambridge Press, New Delhi.
6. King, F.S. (1992). Helping Mothers to Breastfeed. Association for Consumers Action on Safety and Health, Mumbai.
7. Wallace, H.M. and Giri, K.(1990). Health Care of Women and Children in Developing Countries. Third Party Publishing Co. Oakland.
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9. Luke, B. Johnson, T.R.B; Petrie, R.H. (1993). Clinical Maternal-Feta; Nutrition. Little Brown and Co. Bostun
10. ACC / SCN Reports.
11. WHO (1999) Nutrition for Health and Development: Progress and Prospects on the Eve of the 21st Century WHO / NHD / 99.9 Geneva.

12. Alderman, H.; Behrman, J. Lavy, V.; Menor, R. (1997) Child Nutrition, Child Health and School Enrollment, Policy Research Working paper 1700. Washington DC. World Bank.

Course Code: 16080102020200 **Course Category**: **Core**

Course Title: Advanced Nutrition-I

Credit: 04 **Contact hour/week=04**

Course Outcome

This course is designed to:

CO1: Provide in-depth knowledge of the physiological and metabolic role of various nutrients and their interactions in human nutrition.

CO2: Enable students to understand the basis of human nutritional requirements and recommendations through the life cycle.

CO3: Enable students to understand the pharmacological actions of nutrients and their implications.

CO4: Familiarize students with recent advances in nutrition.

Contents

1. **Energy:** Energy content of foods. Physiological fuel level-review. Measurement of Energy Expenditure: BMR, RMR, thermic effect of feeding and physical activity, methods of measurement. Estimating energy requirements of individuals and groups. Regulation of energy metabolism: Control of food intake, digestion, absorption and body weight.
2. **Carbohydrates:** Types, classification, digestion, and transport – review, dietary fibre, fructo-oligosaccharides, resistant starch – chemical composition and physiological effects Glycemic index of foods. Sweeteners – nutritive and non-nutritive.
3. **Proteins:** Classification, digestion, absorption and transport – review. Metabolism of proteins: Role of muscle, liver and gastro intestinal tract. Protein quality, methods of evaluating protein quality. Protein and amino acid requirements. Therapeutic applications of specific amino acids: Branched chain, glutamine, arginine, homocysteine, cysteine, taurine.

4. **Lipids:** Classification, digestion, absorption, transport – review. Functions of EFA Role of n-3, n-6 fatty acids in health and disease Requirements of total fat and fatty acids. Trans fatty acids. Prostaglandins.

Course Code: 16080102020200 P **Course Category**: **Core**

Course Title: Advanced Nutrition-I Practical

Credit: 02 **Contact hour/week=04**

Objectives

The aim of the course is to:

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

Contents

1. Estimation of Protein Quality using different methods PER, B.V, N.P.U., NDP-Cal %.
2. Estimation of energy value of foodstuffs using bomb calorimeter.
3. Estimation of Energy Requirements:
   - BMR
   - Energy expenditure on physical activities.
   - Factorial approach.
4. Balance Studies
   a. Nitrogen balance
5. Assessment of micronutrient status :
   a. Iron
   b. Vitamin C
   c. Vitamin A
   d. Vitamins from B-complex group
6. Bioavailability of selected nutrients

References

1. Annual Reviews of Nutrition. Annual Review Inc. California, USA.

2. Shils, M.E.: Olson, J: Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9th edition. Williams and Williams. A Beverly Co. London.
3. Bodwell, C.E. and Erdman, J.W. (1988) Nutrient Interactions. Marccl Dekker Inc., New York.
4. World – Reviews of Nutrition and Dietetics.
5. WHO Technical Report Series.
6. Indian Council of Medical Research. Recommended Dietary Intakes for Indians – Latest Recommendations.
7. Indian Council of Medical Research. Nutritive value of Indian Foods – Latest Publication.
8. Bordanier, C.D. and Haargrove, J.L. (Ed.) (1996): Nutrients and Gene Expression : Clinical Aspects. Boca Raton, FL CRP Press.
9. Baeurle, P.A. (Ed.)(1994) Inducible Gene Expression. Part-I : Environmental Stress and Nutrients. Beston : Birkhauser.
10. Chandra, R.K. (Ed.)(1992): Nutrition and Immunology, ARTS Biomedical. St. John's Newfoundland.

JOURNALS

1. Nutrition Reviews
2. Journal of Nutrition
3. American Journal of Clinical Nutrition
4. British Journal of Nutrition
5. European Journal of Clinical Nutrition
6. International Journal of Vitamin and Nutrition Research

Effect from June -2019

For Foods & Nutrition only

Course Code: 16080102020300 **Course Category: Core**

Course Title: FOOD SCIENCE AND TECNOLOGY

Credit: 04 **Contact hour/week=04**

Course Outcome

This Course is designed to:

CO1: Provide an understanding of composition of various food stuffs.

CO2:Familiarize students with changes occurring in various foodstuffs as a result of processing and cooking.

CO3: Enable students to use the theoretical knowledge in various applications and food preparations.

Contents:

1. **Constituents of Foods : Properties and significance**
2. **Water and Food Dispersions :**
   - Free and bound water
   - **Water activity and Food Spoilage**
   - Freezing and ice structure
   - Colloidal salts, stabilization of colloidal systems, Rheology of food dispersions
   - Emulsions: Formation, stability, surfactants and emulsifiers.
   - Foams: Structure, formation and stabilization.
3. **Polysaccharides, Sugars and Sweeteners**
   - Starch: Structure, gelatinization, methods for following gelatinization changes.
   - Characteristics of some food starches. Effects of ingredients and conditions on gelatinization. Modified food starches.
   - Cellulose, hemicelluloses, pectins, gums.

- Sugars and Sweeteners: Sugars, syrups, sugar alcohols, potent sweeteners, Sugar products.
- Sweetener Chemistry related to usage in food products: solubility & crystallization, hygroscopic, fermentation & non-enzymatic browning.

4. **Fats: Functional properties of fat and uses in food preparations. Fat deterioration and antioxidants**.
5. **Enzymes**: Nature of enzymes, stability and action. Proteolytic enzymes, oxidases, lipases, enzymes decomposing carbohydrates and applications.
6. **Beverages:** Synthetic and Natural, alcoholic and non-alcoholic, carbonated and non-carbonated, coffee, tea, cocoa, malted drinks.
7. **Leavened Products**: Leavening agents. Biologically leavened and chemically leavened products. Batters and dough.
8. **Food colourents** : Pigments in animal and plant tissues, Food colours – Types, properties, safety issues
9. **Chemical, physical and nutritional alterations occurring in foods during processing and storage**
10. **Introduction to pre and primary food processing**
11. **Methods of food processing**
12. **Product development and evaluation**

REFERENCES

1. Charley, H.(1982): Food Science(2nd edition), John Willey & Sons, New York.
2. Potter, N. and Hotchkiss, J.H. (1996): Food Science, Fifth edition, CBS publishers and Distributors, New Delhi.
3. Belitz, H.D. and Gropsch, W. (1999): Food Chemistry (2nd edition), Springer, New York.
4. Abers, R.J. (Ed.) (1976): Foam, Academic Press, new York.
5. Cherry, J.P. (Ed.) (1981): Protein Functionality in Foods, American Chemical Society, Washington,D.C.
6. Pomeranz, Y. (Ed.) (1991): Functional Properties of Food Components, (2nd edition), Academic Press, New York.

7. Duckworth, R.B. (Ed.) (1978): Water Relation to Foods, Academic Press, London.
8. Parihar, P., Agarwal, R. jain D.K. and Mandhyan, B.L. (1977): Status Report on Dehydration of Eggs. PHT / CAE / Publishers.
9. Marshall, K.R. and Harper, W.J. (1988): Whey Protein Concentrates, IDF Bulletin No.233.
10. Tindall, H.D. (1983): Vegetables in the Tropics, MacMillan, Press, London.
11. Julians, B.O. (Ed.) (1985): Rice Chemistry and Technology, (2nd Edition), American Association of Cereal Chemistry, St. paul Minesota, USA.
12. Bowers, J. (1992): Food Theory and Applications, (2nd Edition), MacMillan Publishing Co., New York.
13. Peckham, G. and Freeland – Graves, G.H. (1979): Foundations of Food Preparation.
14. Becker, P. (1965): Emulsions: Theory and practice, Reinhold, New York.

JOURNALS

1. Journal of Food Sciences.
2. Advances in Food Research
3. Journal of Food Science and Technology
4. Journal of Agricultural and Food Chemistry.
5. Cereal Science
6. Journal of Dairy Science
7. Journal of the Oil Chemistry Society.

Course Code: 16080102020300P **Course Category: Core**

Course Title: Food Science & Technology Practical

Credit: 02 **Contact hour/week=04**

1. **Sugar ad Jaggery Cookery**: Relative sweetness, solubility and sizes of sugars, stages of sugar cookery, caramelization, crystallization, factors affecting crystal formation.
2. **CHO:** Gluten formation and factors affecting gluten formation. Total reducing Sugar from honey
3. **James and Jellies**: Pectin content of fruits, role of acid, pectin and sugar in jam and jelly formation. Use of gums as emulsifiers / stabilizers.
4. **Leavened Products:** Fermentation – Use of Micro organisms (lactic acid, yeast), Steam as an agent, egg as an agent, chemical agents.
5. **Sensory evaluation of foods –**threshold for the different sensations sweet,salty,sour, conduct descriptive analysis
6. **Beverages:** Factors affecting quality of beverages.
7. **Food Colours** : Isolation of various synthetic colours in- jams, squashes, and sauces
8. **Preservation of food** –moisture removal techniques, rehydration test, blanching by peroxidase inactivity test
9. **New product development** –conduct the market research for various new products available, development of a new product

REFERENCES

1. Charley, H.(1982): Food Science(2nd edition), John Willey & Sons, New York.
2. Potter, N. and Hotchkiss, J.H. (1996): Food Science, Fifth edition, CBS publishers and Distributors, New Delhi.
3. Belitz, H.D. and Gropsch, W. (1999): Food Chemistry (2nd edition), Springer, New York.

4. Abers, R.J. (Ed.) (1976): Foam, Academic Press, new York.
5. Cherry, J.P. (Ed.) (1981): Protein Functionality in Foods, American Chemical Society, Washington,D.C.
6. Pomeranz, Y. (Ed.) (1991): Functional Properties of Food Components, (2nd edition), Academic Press, New York.
7. Duckworth, R.B. (Ed.) (1978): Water Relation to Foods, Academic Press, London.
8. Parihar, P., Agarwal, R. jain D.K. and Mandhyan, B.L. (1977): Status Report on Dehydration of Eggs. PHT / CAE / Publishers.
9. Marshall, K.R. and Harper, W.J. (1988): Whey Protein Concentrates, IDF Bulletin No.233.
10. Tindall, H.D. (1983): Vegetables in the Tropics, MacMillan, Press, London.
11. Julians, B.O. (Ed.) (1985): Rice Chemistry and Technology, (2nd Edition), American Association of Cereal Chemistry, St. paul Minesota, USA.
12. Bowers, J. (1992): Food Theory and Applications, (2nd Edition), MacMillan Publishing Co., New York.
13. Peckham, G. and Freeland – Graves, G.H. (1979): Foundations of Food Preparation.
14. Becker, P. (1965): Emulsions: Theory and practice, Reinhold, New York.

JOURNALS

8. Journal of Food Sciences.
9. Advances in Food Research
10. Journal of Food Science and Technology
11. Journal of Agricultural and Food Chemistry.
12. Cereal Science
13. Journal of Dairy Science
14. Journal of the Oil Chemistry Society.

Course Code:16081202020401 **Course Category: Elective**

Course Title: Nutrition for Health & Fitness

Credit: 02 **Contact hour/week=02**

Course outcome

This course will prepare the students to:

CO1: Understand the components of health and fitness and the role of nutrition in these.

CO2: Make nutritional, dietary and physical activity recommendations to achieve fitness and well-being.

CO3: Develop ability to evaluate fitness and well-being.

Contents

1. **Introduction to Nutrition, Health, exercise and fitness**: Nutrition, exercise, physical fitness and health and their inter-relationship. Types of exercise and its health benefits.
2. **Review of different energy systems for endurance and power activity:** Energy input and output. Calculation of energy expenditure by different methods. Fuels and nutrients to support physical activity. Mobilization of fat stores during exercise.
3. **Nutrition in Sports:** Nutritional aspects of macro and micro nutrients in sports. Sports specific requirement. Pre-game, during and post-game meals.
4. **Nutritional and exercise regimes for management of obesity**. Critical review of various dietary regimes for weight and fat reduction.
5. **Dietary supplements and Ergogenic aids:** Definitions, types and use of different ergogenic aids like nutritional, physiological, pharmacological etc and commercial supplements, Sports drinks, sports bars etc. Regulations regarding dietary supplements and ergogenics.

References

1. Mahan, L.K. & Ecott-Stump. S. (2000): Krause's Food, Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.,
2. Sizer, F. & Whitney, E. (2000): Nutrition – Concepts & Controversies, 8th Edition, Wadsworth. Thomson Learning.

3. Whitney, E. N. & Rolfes, S.R. (1999): Understanding Nutrition, 8th Edition, West / Wadsworth, An International Thomson Publishing Co.,
4. Ira Wolinsky (Ed.)(1998): Nutrition in Exercise and Sports, 3rd Edition, CRC Press.
5. Parikova, J. nutrition, Physical activity and health in early life, Ed. Wolinsky, I., CRC Press.
6. Shils, M.E., olson, J.A., Shike, N. and Rossa, A.C. (Ed.) (1999): Modern Nutrition in Health & Disease, 9th Edition, Williams & Wilkins.
7. McArdle, W. Katche, F. and Katch, V. (1996). Exercise Physiology. Energy, Nutrition and Human performance 4th edition, Williams and Wilkins, Philadelphia.

Journals

1. Medicine and Science in Sports and Exercise.
2. International Journal of Sports Nutrition

Course Code: 16080102020402 **Course Category: Elective**

Course Title: Nutrition Epidemiology

Credit: 02 **Contact hour/week=02**

Principles of Nutritional Epidemiology.

Measurement Issues, Measurement of disease, Occurrence and Measures of association, Exposure and Outcome.

Assessment of Food Consumption, Intake and validation of Assessment.

Biochemical Markers of nutrient intake and nutritional status.

Socio demographic and psycho social variables.

Anthropometric measurements.

Design and planning of Nutritional Epidemiological studies.

Assessing, Applying and Evaluating Epidemiological Studies.

References

1. Anisa Basheer (1995) Environmental Epidemology, Rawat Publications, Jaipur.
2. Margetts B.M. and Nelson, M. (1998) Design Concepts in Nutritional Epidemiology. Oxford, New York.
3. Moon, G., Gould, M, (2000) Epidemiology : An Introduction, Open University Press, Philadelphia.
4. Cox, B. Blaxter, M., Buckle, A. et al (1987), Health and Lifestyle Survey, 1984-85. Health Promotion Research Trust , London.
5. Farmer, R. Miller, D. and Lawerson, R. (1996) Lecture Notes on Epidemology and Public
6. Health Medicine. Oxford, New York.
7. Janes, C., Stall R. and S. Gifford (1986): Anthropology and Epidemiology : Interdisciplinary approaches to the Study of Health and Disease Reidel, Dordrecht.
8. Gordis, L. (1996) Epidemiology. Saunders, Pennsylvania.
9. Morris, J.(1975) The uses of Epidemiology. Oxford, New York.
10. Norell, S. E (1998) Workbook of Epidemiology. Oxford : University Press, New York.
11. Armstrong, B.K., White, E., and Saracci, R.(1992): Principles of Exposure Measurement in Epidemology. Oxford University Press.
12. HRSA/MCHB/UIC(1998) Analytic Methods in Maternal and Child Health. Division of Science, Education and Analysis. Maternal and Child Health Bureau. Health Resources and Services Administration. Editors Hardler, A, Roserberg, D, Monahan, C, Kennelly, J.
13. Kiely, M.(ed) (1991). Reproductive and Perinatal Epidemology. CRC Press.

Course Code: 16080102020403 **Course Category**: **Elective**

Course Title: Food Product Development & Marketing

Credit: 02 **Contact hour/week=02**

Objectives

This course will enable students to:

- Understand and know various aspects of food product development including Food Science and Technology, Marketing and Consumer research, finance and communication.
- Develop products which meet consumer needs, and nutritionally and commercially viable.
- Recognize the potential for enterpreneurship through marketing.

Contents

New Food Products

- Definition, Classification, Characterization Factors shaping new product development-Social concerns, health concerns impact of technology and market place influence.

Reasons for new food product development (corporate, market place, technological and governmental influences) Assessing needs from various perspective.

Generation of New Product Ideas

- Internal sources of ideas
- External sources of ideas
- Market place analysis

Screening

Team Approach and involvement of various departments.

- Objectives of screening
- Criterion of screening

Refining the Screening Procedure for the product

- Sensory Evaluation
- Shelf life Testing
- Product Integrity and conformance to standards

References

1. Fuller, G.W.(1994) New Food Product Development : From Concept to Market place CRC Press, New York.
2. Man, C.M.D. and Jomes A.A. (1994) Shelf life Evaluation of Foods. Blackie Academic and Professional, London.
3. Shapton, D.A. and Shapton, N.F.(1991) Principles and Practices for the Safe Processing of Foods. Butterworth Heinemann Ltd , Oxford.
4. Graf, E. and Saguy, I. S. (1991). Food Product Development : From Concept to the Market Place, Van Nostrand Reinhold New York.
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.

Journals

1. International Journal of Food Science and Technology.
2. Food Technology
3. Journal of Food Technology
4. Trends in Food Science and Technology
5. Critical Reviews is Food Science and Nutrition

Course Code: 16081202020500 **Course Category**: **Skill Oriented**

Course Title: Statistics & Computer Application

Credit: 04 **Contact hour/week=04**

Course outcome

CO1: To understand the role of statistics and computer applications in research.

CO2: To apply statistical techniques to research data for analyzing & interpreting data meaningfully.

NOTE: Students should be given hands on experiences to use appropriate software packages for selected statistical analyses.

Unit I: Statistical Analysis

- Conceptual understanding of statistical measures
- Measurement of central tendency
- Measurement of variation
- Skewness and Kurtosis
- Properties and uses of Binomial and normal distribution

Unit II: Testing of Hypothesis

- Typr I and Type II errors
- Levels of Significance

Unit III: Parametric –Small and Large sample test

- Chi square test
- Independence of Attributes 2x2 and rxc contegency tables

Unit IV: Student 't' test and F test

Unit V: Correlation, coefficient of correlation

Course Code: 16081202020500P **Course Category**: **SO**

Course title: Computer Application Practical

Credit: 02 **Contact hour/week=04**

1. MS Office. (A) MS Word (B) MS Excel (C) MS Power point
2. SPSS

References;

1. Dooley, D. (1995): Strategies for interpreting Qualitative Data; Sage Publications, California.
2 Gay, L.R. (1981, 2nd Ed.): Educational Research, Charles. E. Merill, Columbus, Ohio.
3. Long, J.S. (Ed.)(1988): Common Problems Proper Solutions : Avoiding Errors in Quantitative Research**.** Beverly Hills, Sage Publications, California.
4. Mukherjee, R. (1989): The Quality of Life: Valuation in Social ResearcH, Sage Publications, New Delhi.
5. Stranss, A. and Corbin. J. (1990): Basis of Qualitative Research: Grounded Theory Procedures and Techniques, Sage Publications, California.

Detail Syllabus of M.Sc. Home Science

Foods and Nutrition

(Syllabus format on CBCS: June-2016)

Semester-III: Foods & Nutrition

Course Code	Title of The Course	CC	CCr	WH	IM	EM	TM
16080102030100	Institutional Food Administration	Core	04	04	30	70	100
16080102030100 (P)	Institutional Food Administration (Pra)		02	04	--	50	50
16080102030200	Advanced Food Microbiology	Core	04	04	30	70	100
16080102030200 (P)	Advanced Food Microbiology (Pra)		02	04	---	50	50
16080102030300	Advanced Human Physiology	Core	04	04	30	70	100
16080102030300(P)	Instrumentation for Food Analysis (Pra)		02	04	---	50	50
1608120230401	Dietetic techniques and patient counseling	EL (Any one)	02	02	15	35	50
16080102030402	Management of Nutrition programme						
16080102030403	Food Toxicology						
16081202030500	Scientific Writing	SO	04	04	30	70	100
	Total		24	30	135	465	600

CC=Course Category, CCr= Course Credit, WH= Working Hours, IM=Internal Marks, EM =External Marks, TM=Total Marks, Course revision year=16, Faculty code=08, Subject code,= 01 for Foods & Nutrition, 02 for General Home Science and 12 for common for both, Level=02 (PG), Sem=01-04, Paper no= 01-05, Options 00 for Core, Multidisciplinary (MD), and Skill oriented (SO), for Elective =01-05 (EL)

(Interpretation of code 16080102030100 Here 16 means 2016, 08 Home science faculty, 01 means foods & nutrition, 02 means PG level, 03 Semester III , again 01 is paper no and last 00 is for Core course.**)**

Course Code: 16080102030100 **Course Category: Core**

Course Title: Institutional Food Administration

Credit: 04 **Contact hour/week=04**

Course outcome

CO1: To develop a knowledge base in key areas of Institutional Food Administration

CO2: To provide practical field level experience in Institutional Food Administration.

CO3: To impart necessary expertise to functional as a food service manager

CO4: To equip individual to start their own food service unit leading to entrepreneurship

CO5: To develop critical abilities and provide basic grounding in research techniques.

Theory

1. Introduction to Food Service Systems

- Evolution of the Food service industry
- Characteristics of the various types of food service units

2. Approaches to Management

- Theories of Management

3. Management of Resources

Finance

- Determining the finance needed to establish or run an unit
- Budgets
- Sources of finance
- Planning adequate cash flow

Space & Equipment

- Step in Planning layouts
- Determining equipment
- Maintenance of equipment
- Layout analysis

Material

- Menu planning
- Purchase

- Storage
- Quantity food production
- Service and modes of delivery

Staff

- Manpower planning
- Recruitment, induction, training, motivation and performance appraisal

Time and Energy

- Measures of utilization and conservation

4. Cost Accounting / Analysis

- Food cost analysis

5. Marketing and Sales Management

- Marketing strategies
- Sales analysis
- Market Promotion

6. Quality Assurance

- Food quality
- Total quality management

Course Code: 16080102030100P **Course Category: Core**

Course Title: Institutional Food Administration Practical

Credit: 02 **Contact hour/week=04**

1. **Market Survey and Analysis of processed and finished products**
2. **Evaluation of Food Service Unit-2 Conventional, Commissary.**
3. **Market Survey of Food Service Equipment.**
4. **Layout analysis of Kitchens -2**
5. **Planning menus for quantity.**
   - Banquet
   - Outdoor catering
   - Packed meals
   - Restaurant
6. **Standardizing recipes.**
7. **Cost Analysis of menu in**
   - College canteen
   - Hostel mess
   - Hospitals (Private, charitable, government)
8. **Analysis of Food Safety and Hygiene**
9. **Preparation of project to established new food service units**

References: Management

1. West, B. Bsssie & Wood, Levelle (1998). Food Service in Instituiions 6th Edition. Revised by Harger FV, Shuggart SG & Palgne-Palacio June MacMillan Publication Company, new York.
2. Sethi Mohini (1993) Catering management An Integrated Approach 2nd Edition Wiley Publication.
3. Kotas Richard & Jayawardardene, C. (1994): Profitable Food and Beverage management, hodder & Stoughton Publication.
4. Brodner, J. Maschal, H.T., Carlon, H.M. (1982): Profitable Food and Beverage Operation 4th Edition, hayden Book Company, New Jersey.

5. Green, E.E. Drake, G.G. Sweeny, J.F. (1978). Profitable Food and Beverage Management. Planing , operations. Hayden Book Company, new Jersey.
6. Knootz, H, O. Donnel C. (1968): Principles aof Management McGraw Hill Book Company.

Personal management

7. Desseler, Garry (1987): Personnel management Modern Concepts and Techniques, Prentice Hall, new Jersey.
8. Kumar, H.L. (1986): Personal management in Hotel Catering Industries, metropolitan Book Company, New Delhi.
9. Hich Cock M. J. (1980): Food Service System Administration, McMillan Publishing Company.

Cost Control

10. Keiser, J. & Caillo, E. (1974): Controlling and Analysis of Cost in Food Service Operations Wiley and Sons New York.
11. Khari, W. L. (I) (1977): Introduction to Modern Food and Beverage Service (1979). Advanced Modern Food and Beverage Service Prentice Hall Series.
12. Coltman, M.M. (1977): Food and Beverage Cost Control. Prentice Hall Series.
13. Levison (1976): Food and Beverage Operation Cost Control and System management. Prentice Hall Series.

Layout and Design

14. Kazarian, E.A. (1989) Food Service Facilities Planning 3rd Edition Von. Nostrand Reinhold.
15. Avery A.C. (1980): Modern Guide to Food Service Equipment, Boston CBI Publishing Company.
16. Brichfield, J. (1988): Design ad layout of Food Service Facilities, new York, Van Norland Reinhold.
17. Tolve, A.P. (1984): Standardising Food Service for Quality ad Efficiency, AVI Publishing Company INC.

Course Code: 16080102030200 **Course Category: Core**

Course Title: Advanced Food Microbiology

Credit: 04 **Contact hour/week=04**

Course Outcome

This course will enable the student to:

CO1: Gain deeper knowledge of role of micro-organisms in human and environment.

CO2:Understand the importance of micro-organism in food spoilage and to learn advanced, techniques used in food preservation.

CO3: Understand the latest procedures adopted in various food operations to prevent food-borne. Disorders and legal aspects involved in these areas.

Contents

1. Introduction to historical developments in food preservation. Spoilage, infections and legislation.
2. Micro-organisms of importance in Food: Their primary sources in foods, Morphology, cultural characteristics.

   - Factors affecting the growth of microorganisms in food. Intrinsic and Extrinsic parameters that affect microbial growth
3. **Spoilage of different groups of Foods** : Meat, eggs and poultry, fish and other sea foods, canned food.
4. **Food Preservation**: Physical methods – Drying, freeze, drying, , Cold Storage, heat treatment, Irradiation, High pressure processing Chemical Preservatives and natural antimicrobial compounds probiotic bacteria.
5. **Food borne disease**: Bacterial, food-borne important, Mycotoxins.
6. Role of Microbes in fermented foods.

Course Code: 16080102030200P **Course Category: Core**

Course Title: Advanced Food Microbiology Practical

Credit: 02 **Contact hour/week=04**

a. Preparation of common laboratory media and special media for cultivation of bacteria, yeast & molds.
b. Staining of Bacteria: Gram's staining, Acid-fast and Motility of bacteria, staining of yeast and molds.
c. Study of environment around us as sources of transmission of microorganisms in foods. Assessment of surface sanitation of food preparation units swab and rinse techniques.
d. Isolation of microorganisms : Different methods and maintenance of cultures of microorganisms.
e. Bacteriological analysis of water and milk, Total count, MPN Coliform (Count) and MBRT, IMVIC etc.
f. To Perform various biochemical tests used in identification commonly found bacteria in foods: IMVIC urease, H_2S, Catalase, Coagulase, gelatin and fermentation (Acid/ Gas).
g. Demonstration of available rapid methods and diagnostic kits used in identification of microorganisms or their product.
h. Visits (at least two) to food processing unit or any other organization dealing with advanced methods in food microbiology.

References

1. Pelezar, M.I. and Reid, R.D. (1933): Microbiology McGraw Hill Book Company, New York, 5th Edition.
2. Atlas, M. Ronald (1995) Principles of Microbiology, Ist Edition Mosby-year Book, Inc. Missouri, U.S.A.
3. Topley and Wilson's (1983) Principles of Bacteriology, Vitology and Immunity, Edited by S.G. Wilson, A Miles and M.T. Parkar Vol. I : General Microbiology and Immunity II : Systematic Bacteriology. 7th Edition Edward Arnold Publishers.

4. Block, J.G. (1999): Microbiology Principles and Explorations, 4th Edition John Wiley and Sone Inc.
5. Frazier, W.C. (1988): Food Microbiology, McGraw Hill Inc. 4th Edition.
6. Jay, James, M.(2000) : Modern Food Microbiology, 6th Edition, Aspen Publishers Inc. Maryland.
7. Banwant, G. (1989): Basic Food Microbiology, 2nd Edition. CBS Publishers.
8. Garbutt, J. (1997): Essentials of Food Microbiology. Ist Edition, Arnold International Students Editions.
9. Doyle, P. Benehat, L.R. and Mantville, T.J. (1997): Food Microbiology, Fundamentals and Frontiers, ASM, Washington DC.
10. Adams, M.R. and M.G. Moss (1995): Food Microbiology, 1st Edition, New Age International (P) Ltd.
11. Bensaon, H. J. (1990): Microbiological applications, C. Brown Publishers U.S.A.
12. Roday, S. (1999): Food Hygiene and Sanitation, 1st Edition. Tata MacGraw Hill, New Delhi.
13. Venderzant C. and D.F. Splitts Toesser (1992): Compendium of Methods for the Microbiological Examination of Foods 3rd Edition American Public Health Association, Washington DC.

Journals

14. Journals of Food Science Published by the Institute of Food technologists, Chicago 1u. U.S.A.
15. Journal of Food Science and Technology Published by Association of Food Scientists and Technologists (India) CFTRI-MYSORE.
16. Food Technology Published by the Institute of Food Technologists, Chicago 1u. U.S.A.

Course Code: 16080102030300 **Course Category: Core**

Course Title: Advanced Human Physiology

Credit: 04 **Contact hour/week=04**

Course Outcome

This course will enable students to:

CO1: Advance their understanding of some of the relevant issues and topics of human physiology.

CO2: Enable the students to understand the integrated function of the system and the grounding of nutritional science in physiology.

CO3: Understand alterations of structure and function in various organs and systems in disease conditions**.**

Contents

1. **Cell structure and function**: Levels of cellular organization and function organelles, tissues, organs and systems. Brief review: Cell membrane transport across cell, membrane and intercellular communication.
2. **Nervous System**: Review of structure and function of neuron - conduction of nerve impulse, synapses, and role of neurotransmitters - Organization of central and Peripheral nervous system.
3. **Heat and Circulations**-Location and Pericardial Membranes, Chambers—Vessels and Valves, Coronary Vessels, Cardiac Cycle and Heart Sounds, Cardiac Conduction Pathway, Heart Rate, Cardiac Output, Regulation of Heart Rate, , Arteries, Veins, Capillaries, Pathways of Circulation, Velocity of Blood Flow, Blood Pressure, Regulation of Blood Pressure, Aging and the Heart and Vascular System,
4. **Excretory system**: Structure and function of nephron - Urine formation - Role of kidney in maintaining pH of blood - diuretics
5. **Immune system**: Cell mediated and humeral Immunity: Activation of WBC and production of antibodies. Role in inflammation and defense.

References

1. Ganong, W.F. (1985): Review of Medical Physiology, 12th Edition, lange Medical Publication.
2. Moran Campell E.J., Dickinson, C.J., Slater, J.D., Edwards. C.R.W. and Sikora, K. (1984)L Clinical Physiology, 5th Edition, ELBS, Blackwell Scientific Publications.
3. Guyton, A.C. (1985) : Function of the Human Body. 4th 'edition, W.B. Sanders Company, Philadelphia.
4. Guyton, A.C. and Hall, J.B. (1996): Text Book of Medical Physiology, 9th Edition, W.B. Sanders Company, Prism Books (Pvt) Ltd., Bangalore.
5. Wilson, K.J.W. and Waugh, A. (1996): Ross and Wilson Anatomy and Physiology in Health and Illness, 8th Edition, Churchiilli Livingstone.
6. McArdle, W.D., Katch, F.1. and Katch, V.L. (1996): Exercise Physiology. Energy, Nutrition and Human Performance, 4th Edition, Williams and Wilkins, Baltimore.
7. Jain, A.K.: Textbook of Physiology. Vol. I and II. Avichal Publishing Co., New Delhi.

Course Code: 16080102030300P **Course Category: Core**

Course Title: Instrumentation for Food Analysis Practical

Credit: 02 **Contact hour/week=04**

Course Outcome

This course is designed to:

CO1: Introduce students to various modern instrumental techniques in food analysis.

CO2: Understand the applications, strengths and limitations of different methods.

Practicals

1. **Spectrometric Methods**
   a. UV and visible molecular absorption spectrometry
   b. Atomic Absorption Spectrometry, Atomic Emission Spectrometry.
   c. Fluorescence Spectrometry
   d. Atomic mass Spectrometry
   e. Infrared Spectrometry
2. **Separation Techniques**
   a. Chromatographic Separations: Liquid, GC, TLC, super critical fluid extraction chromatography.
   b. Electrophoresis.
3. Viscosity and Consistency Measurements of Food. Measurements of Rheological properties
4. Measurement of specific gravity, freezing point, melting point, refractive index, gel strength, Brix, Densitometry, Refractometry, Polarimetry, Measurement of Colour.
5. Relative Humidity and Water Activity.

References

1. Fung, D.Y.C. ad Matthews, R. (1991): Instrumental Methods for Quality Assurance in Foods, Marcel Dekker, Inc. New York.
2. DeMan, J.M., Voisey, P.W. Rasper, V.F. and Stanley, D.W. (1976): Rheology and Texture in Food Quality. The AVI Publishing Co. Inc. West Port.
3. Skoog, D.A., Holler, F.H. and Nieman (1998): Principles of Instrumental Analysis Saunders College Publishing, Philadelphia.

4. Gruenwedel, D.W.; Whitaker, J.R. (Editors)(1984): Food Analysis Principles and techniques, Volumes 1 to 8, Marcel Dekker, Incc. New York.
5. Herschdoerfer, S.M. (ed.)(1968-1987): Quality Control in the Food Industry, Vols. 1 to 4, Academic Press, London.
6. Moskowitz, H.R. (ed.)(1987): Food Texture: Instrumental and Sensory Measurement : Marcel Dekker, Inc., New York.
7. Pomeranz, Y. and MeLoan, C.E. (1996): Food Analysis: Theory and Practice; 3rd Edition, CBS Publishers and Distributors, New Delhi

Course Code: 16081202030401 **Course Category:**

Elective

Course Title: Dietetic Techniques & Patient Counseling

Credit: 02 **Contact hour/week=02**

UNIT -I

Dietician as part of the medical team and out reach services. Role of dietician .Essential qualities

UNIT -II

Medical history , assessment techniques for obtaining relevant information from patients profile.

UNIT -III

Dietary diagnosis and tests for nutritional status correlating clinical and dietary information.

UNIT -IV

Patient counseling Assessment of patient needs, establishing rapport and counseling relationship, resources and aids to counseling relationship, resources and aids to counseling.

UNIT -V

Aesthetic attributes- Nutritional significance of diet for different clinical conditions. Follow visit and patients education.

Reference:

1. Goyet, fish.. V.; Seaman, J. and Geijer, u-(1978): The Management of Nutritional Emergencies in Large Populations, World Health Organisation, Geneva

2. Refugee Nutrition Information System (ANIS): Newsletters UN ACCISCN Subcommittee on Nutrition.

3. Field Exchange, Newsletters by Emergency Nutrition Network, Dept. of Community Health and General Practice, Ireland.

Course Code:16080102030402 **Course Category: Elective**

Course Title: Management of Nutrition Programmme

Credit: 02 **Contact hour/week=02**

Objectives

This course will enable students to:

- Be familiar with various programmes which can be undertaken to prevent and control nutritional problems at regional and national level.
- Be able to plan, implement, monitor and evaluate programmes.

Contents

1. **Global, National and Regional Concerns –** Situation of vulnerable groups vis-à-vis food, nutrition and health security.
2. **Programme Development –** Overview of programme development models. Formative evaluation approach. Precede – proceed planning model. Sussman's four-step model of empirical curriculum development, chain model.
3. **Programme Planning** – Pre-requisites for planning vis-à-vis short term and long term objectives. Planning at various levels – Government local health department, state, voluntary sector and community-based. Approaches used in planning – Top-down approach, need-based approach. Community participation and partnership, rights-based approach.
4. **Appraisal of existing programmes and interventions –** Merits, demerits. Lacunae-gaps vis-à-vis objectives and goals.
5. **Implementation of Programmes** – Developing prototypes, training and HRD aspects of the programmes. Pilot and prototype studies, innovations.
6. **Scaling – up of programme.** Centralisation and decentralisation, vertical and horizontal linkages, intersectoral linkages, involvement of corporate sectors. Legal issues, Financial management, Cost benefits, Cost effectiveness and Cost efficiency.
7. **Management Information Systems (MIS).**

References

1. Sussman, S. (Editor) (2001): Handbook of Program Development for Health Behaviour Research and Practice, Sage Publications, Inc.
2. Braverman, M.T. (Ed) (1989): Evaluating Health Promotion Programs, Jossey-Bass, San Francisco.
3. Green, L.W. and Kreuter, M.W. (1991): Health Promotion Planning: An Educational and Environmental Approach, Mountain View, CA: Mayfield.
4. Kettner, P.M.; Moroney, R.M.; Martin, L.L. (1990): Designing and Managing Programs: An Effectiveness-based Approach, Newbury Park, CA, Sage.
5. Rossi, P.H.; Freeman, E. (1993): Evaluation: A Systematic Approach, Newbury Park, CA, Sage.
6. Taylor, J.R., Ureda, R.; Denham, J.W. (eds) (1982): Health Promotion: Principles and Clinical Applications Appleton – Century-Crofts, Norwalk, CT.
7. Windsor, R.A., Baranowski, T., Clark, N.; Cutter, G. (1984): Evaluation of Health and Education Programs, Mayfield Palo Alto, California.
8. Fairbanks, J. and Candelaria, J. (1998): Case Studies in Community Health, Sage, Thousand Oaks, CA.
9. Argyris, C.; Putnam, R., McLain, A., Smith, D. (1985): Action Science: Concepts, Methods and Skills for Research and Intervention, Jossey-Bass, San Francisco.
10. Dignan, M.B. and Carr, P.A. (1987): Program Planning for Health Education and Health Promotion, Lea and Febiger, Philadelphia.
11. Kyle, J. (ed) (1987): Children Families and Cities: Programs that Work at the Local Level. Washington DC: National League of Cities.

Course Code: 16080102030403 **Course Category: Elective**

Course Title: Food Toxicology

Credit: 02 **Contact hour/week=02**

Course Outcome

This course is designed for students to:

CO1: Familiarize with hazards and toxicity associated with food and their implications for health.

CO2: Know the various kinds of hazards.

CO3: Be familiar with various tests.

Contents

1. Introduction to Food Safety and Toxicology: Hazards Microbiological, Nutritional, Environmental, natural Toxicants, Pesticide residues and Food Additives.
   - Biotechnology and food safety
   - HACCP
2. Microbial Problems in Food Safety including Mycotoxins and viruses.
3. Intentional Direct Additives: Preservatives, Nitrate and N-nitroso Compounds.
4. Naturally occurring toxicants & Foods contaminants: Sea food toxins, biogenic amines, coffee & methylxanthines, toxicity of mushrooms alkaloids, phenolic compounds, glucosinolates, protease inhibitors, phytate, other antinutritional compounds.
5. Environmental pollution sources: Air, water Hazards involved, Water treatment and waste management.

References:

1. OECD Documents (1996): Food Safety Evaluation. Organisation for Economic co-operation and Development Paris.
2. World Health Organisation (1990): Strategies for Assessing the Safety of Foods Produced by Biotechnology. Report of a Joint FAO/ WHO Consultation – Geneva.
3. Walker and Quattruooi, E. (Eds.) (1980): Nutritional and Toxicological Aspects of Food Processing Tayloss and Francis, New York.

4. Lava, K. : Muller, E. L.: Toxicological Aspects of foods; Elsevier Applied Science, London.
5. Lee, L.W. (Ed.) (1995): Human Tissue Monitoring and Specimen Banking : Opportunities for Exposure Assessment, Risk Assessment and Epidemiologic Research Proceedings of a Symposium Research Triangle Park, NC, March 30 to April 1, 1993. Environ. Health Perspect. 103 (Suppl. 3).

Course Code: 16081202030500 **Course Category: Skill Oriented**

Course Title: Scientific Writing

Credit: 04 **Contact hour/week=04**

Course Outcome

CO1: To be able to appreciate and understand importance of writing scientifically.

CO2: To develop competence in writing and abstracting skills.

Contents

Unit I: Scienctific writing as a means of communication

- Different forms of scientific writing
- Articles in journals
- Research notes and reports
- Review articles
- Monographs
- Dissertation
- Bibliography
- Book chapters and articles

Unit II: Outlines

- Concept of outline
- Importance of outlines
- Objectives of outline
- Types of outlines

Unit III: General principle of writing

- preparing a text for submission and publication
- Drafting
- Outline
- Proof reading
- Brevity and precision
- concepts of preface
- notes (end and footnotes), glossary
- prologue and epilogue
- appendix

- bibliography (annotated) and references cited
- review and index

Unit IV: Dissertation/ Research reports/ Thesis

- Introduction
- Review of literature
- Research design
- Results and discussion
- Summary
- Abstracts
- References/ bibliography
- Justification and recommendations

Unit VI: Writing for Grants

- The question to be addressed
- Rational, importance and justification
- Empirical and theoretical frame work
- Pilot study
- Research proposal
- Research design
- Stage wise organization of study
- Expected outcome and importance
- Available infrastructure and resources
- Budgeting
- Executive Summary

References

1. APA (1994). Publication Manual of American Psychological Association (4th Edition), Washington: APA.
2. Copper, H.M. (1990). Intergrating research: A guide for literature reviews (2nd Edition). California: Sage
3. Dunn, F.V. & Others. (Ed.) Disseminating research: Changing practice, N.Y. Sage
4. Harman, E & Montages, I. (Eds.) (1997). The thesis and the book, New Delhi : Vistar.

5. Locke, L.F. and others (1987). Proposals that work: A guide for planning dissertations & Grant proposals (2nd Ed.) Beverly Hills: Sage.
6. Richardson, L. (1990). Writing strategies. Reaching diverse audience, California : Sage.
7. Stemberg, R. J. (1991). The psychologist's companion: A guide to scientific writing for students & researchers. Cambridge: CUP.
8. Thyer, B.A. (1994). Successful publishing in scholarily journals. California: Sage.
9. Wolcott, H.F. (1990). Writing up qualitative research, Newbury Park: Sage.

Detail Syllabus of M.Sc. Home Science

Foods and Nutrition

(Syllabus format on CBCS: June-2016)

Semester-IV: Foods & Nutrition

Course Code	Title of The Course	CC	CCr	WH	IM	EM	TM
16080102040100	Food Processing and Technology	Core	04	04	30	70	100
16080102040100 (P)	Food Processing and Technology (Pra)		02	04	---	50	50
16080102040200	Advanced Nutrition – II	Core	04	04	30	70	100
16080102040300	Food Safety and Quality Control	Core	04	04	30	70	100
16080102040300(P)	Food Safety and Quality Control (Pra)		02	04	---	50	50
16080102040401	Nutrition in Critical Care	EL (Any one)	02	02	15	35	50
16080102040402	Current Trends in Public Nutrition						
16080102040403	Current Trends in Foods & Nutrition						
16081202040500	Assessment of Nutritional Status	SO	04	04	30	70	100
16081202040500(P)	Assessment of Nutritional Status (Pra)		02	04	--	50	50
	Total		24	30	135	465	600

CC=Course Category, CCr= Course Credit, WH= Working Hours, IM=Internal Marks, EM =External Marks, TM=Total Marks, Course revision year=16, Faculty code=08, Subject code,= 01 for Foods & Nutrition, 02 for General Home Science and 12 for common for both, Level=02 (PG), Sem=01-04, Paper no= 01-05, Options 00 for Core, Multidisciplinary (MD), and Skill oriented (SO), for Elective =01-05 (EL)

(Interpretation of code 16080102040100 Here 16 means 2016, 08 Home science faculty, 01 means foods & nutrition, 02 means PG level, 04 Semester IV , again 01 is paper no and last 00 is for Core course.**)**

Course Code: 16080102040100 **Course Category: Core**

Course Title: FOOD PROCESSING AND TECHNOLOGY (Core)

Credit: 04 **Contact hour/week=04**

Course Outcome

This course is designed for students to:

CO1: Impact systematic knowledge of basic and applied aspects of food processing and technology.

CO2: Provide the necessary knowledge of basic principles and procedures in the production of important food products.

CO3: Orient the students to potential use of various by products of food industry.

Contents

1. **Physical principles in food processing operations**:

Thermal processing: Degree of processing of preservation, selecting heat, treatments, heat resistance of micro organisms, nature of heat transfer, protective effects of food constituents, types of thermal treatments.

2. **Rice Technology** - Production, processing, milling of rice, parboiling, processes, by products of rice milling and their utilization. Nutrient loss during processing.
3. **Wheat Technology** - Production, processing, manufacture of breakfast cereals
4. **Pulses -** Production, types of processing of different pulse products - Soyabean Processing.
5. **Technology of oil seeds** - Processing, meal concentrates and isolates.
6. **Mushroom -** Production, processing, utilization.
7. **Meat** - Production, processing, smoking and curing of meat, grading.
8. **Poultry** - Production, preparing poultry for consumption, packaging.
9. **Fish -** Production, effect of handling practices, storage of eggs.
10. **Waste disposal and sanitation:** Waste characteristics, treatments and technologies, food plant sanitation.

REFERENCES

1. Saiauel, A. Matz., The Chemistry and Technology of cereals of Foods and Feed", BS Publishers and Distributors, 1996.

2. G.C. Banerjee, Poultiy, Oxford and IBH Publishing CODUB Ltd., New Delhi.

3. Giridhari Lal,G.S.Sidhappa and G.L.Tandon-Preservation of fruits and vegetables, ICAR, New Delhi,1998

4. Raghurent Chinatamini, Advances in Agro Industry and Food Processing, Dominant Publishers and Distributors, 1999.

5. Shakuntala Manay, N., Shadak Cheraswamy, M., Food Facts and Principles, Wiley Eastern Ltd., 1987.

6. R & D at the CFTRI, Three decades M.R. Raghavendra Rao, K.R. Bhatt achaiya and J.V. Shankar CFTRI, Mysore.

7. Research and Development at CFTRI, 1950 — 2000, CFTRI, Mysore.

8. Potter, N.W. Food Science, AVI Publishing Co., Connecticut, 1960.

9. Processed food Industry

10. Journal of Indian food industry

11. D.K.Salunkhe,S.S.kadam-Handbook of vegetable science and technology,Marcel Dekker Inc,New York,2005.

Course Code: 16080102040100P **Course Category: Core**

Course Title: FOOD PROCESSING AND TECHNOLOGY Practicals

Credit: 02 **Contact hour/week=04**

1. Blanching and browning control
2. Dehydrated products -vegetables dices tray drying of seasonal fruit.
3. Tomato processing
4. Changes in ascorbic acid content during different types of processing in food sample
5. Acid value of different oils and changes during processing.
6. Estimation of ascorbic acid from food sample which is steamed, boiled and fresh
7. To study the effect of different ingredients on sag and organoleptic properties of jelly.
8. To study the effect of different sweeteners on organoleptic properties of fruits.
9. Extending Shelf Life of Fruits using different food preservatives
10. Prepare a project report for any food processing plant.

References:

1. Gould, G.W. (1995), New Methods of Food preservation, Blackies Academic & Professional, London.
2. Connor, J.M. and Schick, W.A. (1997), Food processing an industrial powerhouse in transition, John Wiley and Sons, new York.
3. Arthey, D. and Ashurt, P.R. (1996), Fruit processing, Blackies academic & Professional, London.
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6. Kap, K. Lorenz, K and Brummer, J. (1995) Frozen and Refrigerated doughs & batters, American association of cereal chemists INC. St. Paul. Minnesota.
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8. Matz, S.A. (1996), Bakery Technology and Engineering, Third edition CBS Publishers, New Delhi.
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11. Salunkhe, D.K. and S.S. Kadam (1995), Handbook of Fruit Science and Technology; Production, composition storage and processing Marcel Dekket INC. New York.
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13. Oliveira, A. R. oliveira, J.C. (1999), Processing Foods quality optimization ad process assessment, CRC press, Boca raton.
14. Peter Fellows (Ed.) (1997), Traditional Foods; Processing for profit Intermediate Technology Publications, London.

Course Code: 16080102040200 **Course Category: Core**

Course Title: ADVANCED NUTRITION – II

Credit: 04 **Contact hour/week=04**

Course Outcome

This course is designed to:

CO1: Provide in depth knowledge of the physiological and metabolic role of various nutrients and their interactions in human nutrition.

CO2: Enable students to understand the basis of human nutritional requirements and recommendations through the life cycle.

CO3: Enable students to understand the pharmacological actions to nutrients and their implications.

CO4: Familiarize students with the recent advances in nutrition.

Contents

1. Water Regulation of intra and extra cellular volume. Osmolality, water balance and its regulation.
2. Minerals: (Note: For each nutrient sources, bioavailability, metabolism, function, requirements. RDI/ESADDI, deficiency and toxicity, interactions with other nutrients are to be discussed).

   Macro minerals: calcium, phosphorus, magnesium, sodium, potassium & chloride.

   Micro minerals: Iron, copper, zinc, manganese, iodine, fluoride.

   Trace minerals: Selenium, cobalt, chromium , vanadium, silicon, boron, nickel.
3. Vitamins; Historical background, structure, food sources, absorption and transport, metabolism, biochemical function, assessment of status. Interactions with other nutrients Physiological, pharmacological and therapeutic effects, toxicity and deficiency with respect to the following:

   a) Fat soluble: Vitamins A, D, E & K.

   b) Water soluble: Thiamine, riboflavin, niacin, biotin, pyridoxine, folic acid, pantothenic acid, ascorbic acid, cyanocobalamin, choline, inositol.

4. Non-nutritive food components with potential health effects: Polyphenols, tannins, phytate, phytoestrogens, cyanogenic compounds, lectins and saponins.
5. Nutritional regulation of gene expression.
6. Nutrition management in special conditions: space travel, high altitudes, low temperatures, submarines.

References

1. Annual Reviews of Nutrition. Annual Review Inc. California, USA.
2. Shils, M.E.: Olson, J: Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9th edition. Williams and Williams. A Beverly Co. London.
3. Bodwell, C.E. and Erdman, J.W. (1988) Nutrient Interactions. Marccl Dekker Inc., New York.
4. World – Reviews of Nutrition and Dietetics.
5. WHO Technical Report Series.
6. Indian Council of Medical Research. Recommended Dietary Intakes for Indians – Latest Recommendations.
7. Indian Council of Medical Research. Nutritive value of Indian Foods – Latest Publication.
8. Bordanier, C.D. and Haargrove, J.L. (Ed.) (1996): Nutrients and Gene Expression : Clinical Aspects. Boca Raton, FL CRP Press.
9. Chandra, R.K. (Ed.)(1992): Nutrition and Immunology, ARTS Biomedical. St. John's Newfoundland.

JOURNALS

10. Nutrition Reviews
11. Journal of Nutrition
12. American Journal of Clinical Nutrition
13. British Journal of Nutrition
14. European Journal of Clinical Nutrition

Course Code: 16080102040300 **Course Category: Core**

Course Title: FOOD SAFETY AND QUALITY CONTROL (Core)

Credit: 04 **Contact hour/week=04**

Course Outcome

This Course will enable students to:

CO1: Know the importance of quality assurance in food industry.

CO2: Know the various tests and standards for quality assessment and food safety.

CO3: Know the various test used to detect food adulterants

CO4: Be familiar with the fundamentals that should be considered for successful quality control programme.

Contents

1. Introduction to quality assurance and food safety assurance. Current concepts of quality control.
2. Quality assurance programme : Quality plan, documentation of records, process control and HACCP, hygiene and housekeeping, corrective action, quality and programme and total quality process.
3. Product Evaluation :
   - Sampling for product evaluation and line control.
   - Specification and Food standards, International, National
   - Mandatory, Voluntary.
   - Sample preparations
   - Reporting results and reliability of analysis.
4. Test for specific raw food ingredients and processed Food including additives:
   a. Nutrient analysis
   b. Tests of adulterants
5. Consumer Protection

Course Code: 16080102040300P **Course Category: Core**

Course Title: FOOD SAFETY AND QUALITY CONTROL Practical

Credit: 02 **Contact hour/week=04**

Course Outcome

CO1: To test different foods for their quality

CO2: To detect adulteration in different foods

CO3: To be familiar with test used for quality control.

1. Assessment of purity and quality using appropriate standard test for the following :
    - Water including mineral water
    - Milk ad milk products
    - Fats and oil including butter, ghee and hydrogenated fat
    - Ice creams and sherbets
    - Cereals and cereal product
    - Pulses and legumes
    - Spices ad condiments and salt, pickles, sauces and chutneys.
    - Tea and Coffee
    - Confectionery
    - Specific food ingredients such as vinegar.
    - Fruit juices, concentrates and beverages.
2. Detection /Estimation of Contaminants

References

1. Early, R. (1995): Guide to Quality Management Systems for the Food Industry, Blackie, Academic and Professional, London.
2. Gould, W.A. and Gould, R.W. (1988): Total Assurance for the Food Industries, CTI Publication Inc. Baltimore.
3. Pomeranz, Y. ad MeLoan, C.E. (1996): Food Analysis: Theory and Practice, CBS Publishers and Distributor, New Delhi.
4. Askar, A. ad Treptow, H. (1993): Quality Assurance in Tropical Fruit Processing, Springer – Verlag, Berlin.

5. World Health Organisation (1998): Guidelines for Drinking Water Quality, 2nd edition, Vol. 1, 2 and 3Geneva.
6. Marth, E.H. (1978): Standard Methods for the Examination of Dairy Products 14th ed. Or edition. Interdisciplinary Books and Periodicals, Washington, D.C.
7. Ranganna, S. (1986): handbook of Analysis and Quality Control for fruit and Vegetables Products, 20th edition, Tata McGraw Hill Publishing Co. Ltd. new Delhi.
8. Hagstad, H.V. and Hubber, W.T. (1986): Food Quality Control, Foods for Animal Origin, lowa state University Press, A<ES.
9. Nielson, S.S. (1994): Introduction to the Chemical Analysis of Food, Jones and Bartic Publishers, Boston.
10. James, C.S. Academic and Professional (Champman and Hall), Madras.
11. Bryan, F.L. (1992): Hazard Analysis Critical Control Point Evaluations. A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. World Health Organization, Geneva.
12. Kirk, R. S. and Sawyor, R. (1991): Peerson's Composition and Analysis of Foods, Longman Scientific and Technical. 9th Edition, England
13. Food and Agricultural Organisation (1980): Manuals of Food Quality Control. 2: Additives Contraminants Techniques, Rome.
14. Bureau of Indian Standards: Specifications and Standard Methods.

Course Code: 16080102040401 **Course Category: Elective**

Course Title: Nutrition in critical Care

Credit: 02 **Contact hour/week=02**

Objectives

The course will enable the students to:

- Understand the physiology, metabolism and special nutritional requirements of the critically ill.
- Be familiar with the special nutritional support techniques and feeding formulations to meet their nutritional needs.

Contents

1. **Nutritional screening and nutritional status assessment of the critically ill.**
2. **Nutritional support systems and other life – saving measures for the critically ill.**
3. **Role of immuno enhancers, conditionally essential nutrients, immunosuppressants, and special diets in critical care**
4. **Patho-physiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like**
   - Stress, trauma, sepsis, burns
   - CV complications and surgery
   - Cancer
   - AIDS
   - GI tract surgery, GER (Gastro-esophageal reflux) and complications
   - Hepatic failure and transplants
   - Neurosurgery

References

1. Zaloga, G.P. (1994): Nutrition in Critical Care, Times Mirror/Mosby.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (Ed) (1999): Modern Nutrition in Health and Disease. 9th Edtion, Williams and Wilkins.
3. Shikora, S.A. and Blackburn, G.L. (Ed) (1999). Nutritional Support – Theory and Therapeutics, Chapman and Hall, ITP (International Thomson Publishing).
4. Mahan, L.K. and Escott – Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Ed. W.B. Saunders Ltd.
5. Phillips, G.D. and Lodgers C.L. (1986). Parenteral and Enteral Nutrition. A Practical Guide. Churchill Livingstone.
6. Kinney, J.M. and Borum, P. R. (editors) (1989) Perspectives in Clinical Nutrition. Urban and Schwarzenberg.
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8. Keynes, W. M. and Fowler, P.B.S. (1984) Clinical Endocrinology.William Heinemann Medical Books, London.
9. Shields, R. (editor) (1992) Bailliere's Clinical Gastroentrology, Bailliere Tindall London
10. Galambos, J. P. (1979) Cirrohsis in the series Major Problems in Internal Medicine,W. B. Saunders Company Philadelphia

Course Code: 16080102040402 **Course Category: Elective**

Current Trends in Public Nutrition

Credit: 02 **Contact hour/week=02**

It deals with current topics and Issues related to Public Nutrition.

(1) Current strategies and programmes to combat public nutrion.

(2) Recent advances in nutrition education programme.

(3) Food security.

(4) Food fortificatuion.

(5) Relationship between fertility, nutrition and quality of life.

(6) Recent advances in public health and nutrition.

Course Code: 16080102040403 **Course Category: Elective**

Course Title: CURRENT TRENDS IN FOODS & NUTRITION

Credit: 02 **Contact hour/week=02**

Contents

Recent developments in Foods & Nutrition such as :

(1) Dietary fiber: Definition, classification, properties, physiological effects and therapeutic uses.

(2) Essential fatty acids: Definition, structures, sources, bioavailability, functions and health benefits.

(3) Anti oxidants: Definition, classification, free radical generation and it's effect on health, role of different antioxidants in health.

(4) Genetically modified foods: Advantages and disadvantages.

(5) Nutraceuticals: definition, classification, dietary supplements, medicalfoods, functional foods and farmaceuticals, regulation.

(6) Fermented foods: Importance, benefits and examples.

(7) Pica and celiac disease: causes, prevention and diet.

(8) Role of Zinc and Manganese in health.

(9) Nutrigenomics and nutrigenetics: Definition and importance.

References:

(1) Jwels of foods and nutrition, Dr. R. V. Raval, Department of Home Science, Saurashtra Univercity, Rajkot.

(2) WHO – Technical report series.

(3) Garrow, J.S. James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietitics, 10th Edition, Churohill Livingstone.

Course Code: 16081202040500 **Course Category: Skill Oriented**

Course Title: ASSESSMENT OF NUTRITIONAL STATUS

Credit: 04 **Contact hour/week=04**

Course Outcome

The course is designed to:

- Orient the students with all the important state-of-the-art methodologies applied in nutritional assessment and surveillance of human groups.
- Develop specific skills to apply the most widely used methods.

Contents

Theory

1. Nutritional assessment as a tool for improving the quality of life of various segments of the population including hospitalized patients.
2. Current methodologies of assessment of nutritional status, their interpretation and comparative applications of the following :
    - Food consumption
    - Anthropometry
    - Clinical and Laboratory
    - Rapid Assessment & PRA
    - Functional indicators such as grip strength, respiratory fitness, Harvard Step test, squatting test.
3. Nutritional Surveillance – Basic concepts, uses and setting up of surveillance systems.
4. Monitoring and Evaluation

Course Code: 16081202040500P **Course Category: Skill Oriented**

Course Title: ASSESSMENT OF NUTRITIONAL STATUS Practical

Credit: 02 **Contact hour/week=04**

1. Training in all assessment techniques applicable for individuals and community, including ones used for hospital – based patients
    - Validity and reliability of these techniques.
2. Community based project for assessment of nutritional status of any vulnerable group.
3. A small evaluation study of a nutrition project.

References

1. Jelliffe, D. B. and Jelliffe, E.F.P. (1989): Community Nutritional Assessment, Oxford University Press.
2. Beghin, I., Cap, M. and Dujardan, B. (1988): A Guide to Nutritional Status Assessment, WHO, Geneva.
3. Gopaldas, T. and Seshadri, S. (1987): nutrition Monitoring and Assessment, Oxford University Press.
4. Mason, J.B., Habich, J.P., Tabatabai, H. and Valverde, V. (1984): Nutritional Surveillance, WHO.
5. Lee, R.D. and Nieman, D.C. (1993): Nutritional Assessment, Brown and Benchmark Publishers.
6. Sauberlich, H.E. (Ed.) (1999): Laboratory Tests for the Assessment of Nutrition Status, CRC Press.
7. Cameron, N. (1984): Measures of Human Growth, Sheridan house Inc. New York.
8. Scrimshaw, N. and Gleason, G. (Ed.)(1991): Rapid Assessment Methodologies for Planning and Evaluation of Health Related Programmes, published by (INFDC) International Nutrition Foundation for Developing Countries.
9. FAO Nutritional Studies No.4 (1953): Dietary Surveys: Their Technique and Interpretation, FAO.

10. Bingham, S.A. (1987): The Dietary Assessment of Individuals, Methods, Accuracy, new Techniques and Recommendations. Nutrition Abstracts and Reviews, 57: 705-743.
11. Collins, K.J. (Ed.)(1990) handbook of Methods for the Measurement of work performance, Physical Fitness and Energy Expenditure in Tropical Populations. International Union of Biological Sciences.
12. Ullijaszek, S.J. & Mascie-Taylor, C.G.N. (Ed.) Anthropometry: the individual and the Population. Cambridge University Press, Cambridge.
13. Shetty, P.S. and James, W.P.T. (1994): Body Mass Index A measure of Chronic Energy Deficiency in Adults. FAQ Food and Agriculture Organization of the United Nations, Rome.
14. Davies, P.S.W. and Cole, T.J. (Ed.): Body Composition Techniques in Health and Disease. Cambridge University, Cambridge.
15. Himes, J.H. (1991): Anthropometric Assessment of Nutritional Status. Wiley-Liss, New York,
16. Lohman, T.G.; Roche, A.F.; and Martorell, R. (Ed.) Anthropometric Standardization Reference manual, Human kinetics Books, Ilinois.