**BHARATHIAR UNIVERSITY: COIMBATORE – 641 046**
**M. Sc. FOOD AND NUTRITION DEGREE COURSE**
**(with effective from the academic year 2016 - 17)**
**SCHEME OF EXAMINATION (Revised) (Affiliated Colleges)**

| Sem | Study Components | Course Title | Ins. Hrs week | Exam | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Dur. | Internal | External | Total | Credit |
| I | Paper I | Food Science | 5 | 3 | 25 | 75 | 100 | 4 |
| | Paper II | Nutrition through life cycle | 5 | 3 | 25 | 75 | 100 | 4 |
| | Paper III | Nutritional Biochemistry | 6 | 3 | 25 | 75 | 100 | 4 |
| | Paper IV | Nutrition in Disease - I | 5 | 3 | 25 | 75 | 100 | 4 |
| | | Elective Paper I | 3 | 3 | 25 | 75 | 100 | 4 |
| | Practical I | Food Analysis Practical | 6 | 3 | 40 | 60 | 100 | 4 |
| II | Paper V | Food Processing | 5 | 3 | 25 | 75 | 100 | 4 |
| | Paper VI | Research Methodology and Statistics | 5 | 3 | 25 | 75 | 100 | 4 |
| | Paper VII | Macronutrients | 5 | 3 | 25 | 75 | 100 | 4 |
| | Paper VIII | Nutrition in Disease – II | 5 | 3 | 25 | 75 | 100 | 4 |
| | Paper IX | Nutraceuticals and functional foods | 4 | 3 | 25 | 75 | 100 | 4 |
| | Practical II | Nutrition in Disease Practical | 3 | 3 | 40 | 60 | 100 | 4 |
| | | Elective Paper II | 3 | 3 | 25 | 75 | 100 | 4 |
| III | Paper X | Micronutrients | 6 | 3 | 25 | 75 | 100 | 4 |
| | Paper XI | Community Nutrition | 4 | 3 | 25 | 75 | 100 | 4 |
| | Paper XII | Physiological Aspects of Nutrition | 6 | 3 | 25 | 75 | 100 | 4 |
| | Practical III | Biochemical Analysis Practical | 6 | 3 | 40 | 60 | 100 | 4 |
| | Paper XIII | **Applications of Computers in Nutrition** | 2 | 3 | 10 | 40 | 50 | 2 |
| | | Practical | 3 | 3 | 20 | 30 | 50 | 2 |
| | | Elective Paper III | 3 | 3 | 25 | 75 | 100 | 4 |
| IV | Paper XIV | Food Biotechnology | 6 | 3 | 25 | 75 | 100 | 4 |
| | | Mini Project* | - | - | - | - | 50* | 2 |
| | | Elective Paper IV - Practical | 3 | 3 | 40 | 60 | 100 | 4 |
| | Project work (Project work : 80 & Viva-voce : 20 marks | | 21 | | | | 100 | 4 |
| | Total | | | | | | 2250 | 90 |

15 days training in multi specialty hospital to qualify for the degree
* One month training in Food industry and submit a mini project.
For Project work: 40 marks & Viva-voce:10 marks

**List of Group Elective papers :**
**Colleges can choose any one of the Group papers as electives)**

| | GROUP A | GROUP B |
|---|---|---|
| Paper I/ Sem I | Convenience foods | Institutional Food Management |
| Paper II/Sem II | Food packaging | Food Product Development and Marketing |
| Paper III/Sem III | Food quality control | Culinary Techniques |
| Paper IV/Sem IV | Food quality control - Practical | Food Service Management Practical |

**Note: The revised syllabi/ practicals for the following papers furnished below be followed and there is no change in the existing scheme of examination and syllabi of remaining papers. The title of the** Paper XIII Software Programming in Nutrition of semester III has been renamed as **Applications of Computers in Nutrition**

**SEMESTER-I-PAPER II**
**NUTRITION THROUGH LIFE CYCLE**
**Hours of Instruction / week: 5**

**Objectives**
Enable the students
1. Understand the role of adequate nutrition in stages of life cycle.
2. Gain knowledge on methods of assessment of the nutritional status of population groups.

**UNIT I**
Concept of health recommended dietary allowances for Indians, basis for requirement, computation of allowance. ICMR - Indian recommended allowances

**Nutrition in pregnancy** - Stages of gestation, maternal physiological adjustments, weight gain during pregnancy and nature of weight gain, nutritional requirements, physiological cost of pregnancy, complications of pregnancy and adolescent pregnancy.

**UNIT II**
**Nutrition in Lactation** - Physiological adjustments during lactation, hormonal controls and reflex action, lactation in relation to growth and health of infants, physiology of milk production, problems of breast feeding, nutritional components of colustrum and mature milk, special foods during lactation, nutritional requirements during lactation.
**Nutrition in infants** - Rate of growth, weight as the indicator, premature infant, feeding premature infants, low birth weight, breast vs. bottle feeding, nutritional allowances, supplementary feeding, weaning foods.

**UNIT III**
**Nutrition in Preschool Children** - Growth and development of preschool children, prevalence of malnutrition (Vitamin A, deficiency, anaemia, IDD) in preschool age, food habits, nutritional requirements, supplementary foods.
**Nutrition in School Age** - Early and middle childhood, physiological development, food habits, nutritional needs and feeding, RDA, Foods habits. Feeding of sick children and children with special needs.

**UNIT IV**
**Nutrition During Adolescence** - Physical growth, physiological and psychological problems associated with pubertal changes, nutritional needs, eating disorders — anorexia nervosa, bulimia nervosa, Nutiriton and Medical problems during adolescents.

**Nutrition During Adulthood** — Nutrition and work efficiency, basis for requirements, Nutrition in Menopause – Osteoporosis.
**Nutrition for Old Age** - Socio economic and psychological factors — nutritional requirements, factors affecting food intake, clinical needs and malnutrition, institutionalized changes in old age. Advances in geriatric nutrition.

**UNIT V**
**Nutrition for physical activity and exercise** - Body systems involved in physical activity (Cardio-respiratory and musculo-skeletal system), benefits of an active lifestyle (cardiorespiratory,
musculo-skeletal improvements and other health benefits of physical activity),
physical fitness assessment — cardio respiratory fitness, assessment of body composition, muscular fitness assessment, flexibility assessment.

Exercise and thermogenesis, role of carbohydrate, fat and protein as a fuel for exercise, fluid and electrolyte balance during prolonged exercise, nutritional requirements in sports, dietary intake before, during and after exercise.

**REFERENCES**

1. Vinodhni Reddy, Prahiad Rao, Govmth Sastry and Kashinath, "Nutrition Trends in India", NIN, Hyderabad, 1993.
2. Shills, E.M. Olson, A.J. and Shike, Lea and Febiger, "Modern Nutrition in Health and Diseases".
3. Frances, J. Zeman, Nutrition and Dietetics, 1983.
4. B. Srilakshmi, "Dietetics", New Age International Pvt. Ltd, 2003.
5. B. Srilakshmi, "Nutrition Science", New Age International Pvt. Ltd., 2003.
6.Krause's Food,nutrition and diet therapy,Eleventh edition

## SEMESTER – III :PAPER - XI
## COMMUNITY NUTRITION
**Hours of instruction / week: 4**

**Objectives**

To enable students
1. Gain insight into nutritional problems of the community
2. Understand the various nutrition intervention programmes of vulnerable groups in the community
3. Appreciate national and international agencies towards nutrition in programmes.

**UNIT I**

**Emergency situations**

Famine, drought, flood, earthquake, cyclone, Tsunamis, coastal hazards, war, civil and political emergencies and factors giving rise to emergency situation in these disasters. Illustration using case studies from Indian subcontinent. Food security, nutrition security, Millenium development goals.

**UNIT II**

**Protein energy malnutrition (PEM)** - Etiology, types, prevalence, metabolic changes and prevention.

**Nutritional Anaemia** - Definition, causes, types, prevalence, anemia control programme in India.

**Iodine Deficiency** : Causes, prevalence, clinical features and control programme in India.

**Fluorosis :** Causes, prevalence, Clinical features, Fluorosis control programme in India.

**Vitamin A deficiency :** Causes, signs and symptoms,prevention &prophylaxis

**B complex deficiency :** Causes, signs and symptoms,prevention.

**Assessment of Nutritional Status**

Dietary survey, biochemical methods, growth monitoring methods, food consumption survey, body composition studies. Test of intelligence related to nutrition.

**UNIT III**

**Nutrition Intervention Programmes**

Objectives, Special nutrition programme (SNP), Modified Applied Nutrition Programmes (ANP), Integrated Child Development Services (ICDS), Tamil Nadu Integrated Nutrition programme (TFNP) and Noon Meal Scheme.

**Role of International Organizations** - Food and Agriculture Organization (FAO), World

Health Organisation (WHO), United Nations International Children's Emergency Fund (UNICEF), Co-operative American Relief Everywhere (CARE) and World Bank.

**National Organizations**

National Institute of Nutrition (NIN), National Nutrition Monitoring Bureau (NNMB), Indian Council of Agriculture Research (ICAR), Indian Council of Medical Research (ICMR), Central Food Technological Research Institute (CFTRI).

**UNIT IV**

**Nutrition Education** - Objectives, definitions, importance of nutrition education to the community.

**Methods of nutrition education, nutrition education programmes** - Planning, implementation and evaluation, training workers in nutrition education programmes, integration of nutrition education with education and extension of works, nutrition and health education for adolescent girls, lactating and pregnant women. Nutrition education in schools and community.

**UNIT V**

Concepts of community Health, National Health Policy, Primary Health Center (PHC)- Concept, organization, current status in India and delivery of service, Taluk level hospitals, Employees State Insurance (ESI)

**Epidemiology of Communicable Diseases**

Factors responsible for the spread of communicable diseases, mode of transmission — chicken pox, typhoid fever, tuberculosis,malaria, leprosy, filariasis and AIDS.Prophylaxis and Immunization schedule .Waste disposal system in India.

**REFERENCES**

I. Proceedings of the Nutrition Society of India, Vol. 35, 42, 43, 44, 46 and 47, 1999, N1N, Hyderabad.
2. S. Wal Ruchi Mishra, Encyclopedia of Health Nutrition and Family Welfare, Published by Sarup and Sons, New Delhi, 2000.
3. Hojn C., Water low, Andrew M. Tomkins, Sally M. Grantham. MC, Anegor, "Protein Energy Malnutrition", Published by Edward Arnold, 1992.
4. Vinodini Reddy, Praihad Rao, Gowrinath Sastry, J. and Kashinath, K.C., Nutrition Trends in India, N1N, Hyderabad, 1993.
5. Park and Park, Text book of preventive and social medicine, Banarsidas Published by Jahalpu, 1995.
6. Jelliffee, D.D. Pathes, Assessment of Nutritional Status of community, WHO Geneva, 1989.
7. Sarala Gopalan (1996), Towards better nutrition for women and children, Problem and Programmes, Department of Women and Child Development, Government of India.
8. Susheela, A.K. (1997), Drinking water quality surveillance and Prevention of diseases : Participation of Health Department Personnel in the safe drinking water mission activities and benefits thereof. In the proceedings of the National Workshop on water quality monitoring and surveillance in rural areas Rajiv. Gandhi National Drinking Water Mission, August 1997.
9. Susheela, A.K. and Jethnandani, P. (1996), Circulating Test Osterone levels in skeletal fluorosis patients, Clinical Toxicology.
10. Bagchi, K. Evaluation of nutrition education in nutrition monitoring and assessment, Editors — Gopaldas T. and Seshadris, Oxford University Press, Delhi, 1987.
11. Long-term follow up of school health education programme, World Health Forum, 1996,

**SEMESTER III; CORE PRACTICAL-IlI**
**BIOCHEMICAL ANALYSIS PRACTICAL**
**HOURS OF INSTRUCTION/WEEK: 6**

**I.QUALITATIVE ESTIMATION of**
A. Sugars-Mono, Di And Polysaccharides
B. Proteins And Amino Acids

**I. ANALYSIS OF BLOOD FOR**
A. Glucose
B. Haemoglobin And Iron
C. Cholesterol
D. Pyruvic Acid
E. Serum AG Ratio
F. Serum Phospholipid
G. Serum Protein
H. Serum Alkaline Phosphate

**III. ANALYSIS OF URINE FOR**
A. Creatinine
B. Urea
C. Total Nitrogen
D. Calcium
E. Phosphorus
F. Vitamin-C
G. Uric Acid

**SEMESTER- III**
**PAPER XIII**
**Applications of Computers in Nutrition**
**HOURS OF INSTRUCTION / WEEK: 2(theory)+3(practical)**

**Objectives**

To enable students
a. Gain knowledge on Ms-Access Version 2002.
b. Acquire knowledge to create software in Nutrition using VB.

**UNIT I**

**Introduction to Windows 2000** - Working within a window, using start menu, using explorer, using toolbars, menus and dialog boxes, customizing the Desktop via control panel opening control panel, using Accessibility options, adding and removing programs, setting date and time, customizing screen display, Adjusting the mouse, controlling drives, folders and files, recycle bin.
**Introduction to Ms-Access 2002-Database** - Creating a database, opening a database, closing a database, printing database, introduction to database objects.
**Table** - Creating table in design view and table wizard, setting primary key, creating Relationship between tables, enforcing referential integrity, customizing fields and tables, importing and linking a table.

**UNIT II**

**Queries** - Creating a query in design view, working with design, creating different types of queries in wizard, using queries to calculate values and summarising the data.
**Forms** - Creating a form in design view and wizard, modifying on existing from, creating a subform.
**Reports -** Creating a report in design view and in wizard, creating a summary report, modifying an existing report, calculating values in a report, grouping report records, creating a subreport, creating mailing labels.
Adding and deleting controls to forms and reports, beautifying forms and Reports - formatting text, adding lines, shapes, borders, pictures / images and clip art, setting image, alignment.

**UNIT III**

**Introduction to Visual Basic** - Introduction to development environment, forms - setting form properties, form events and methods, common intrinsic controls - setting properties for controls, events and methods for controls, adding controls to forms, dialog boxes - Input Box, MsgBox, Common dialog boxes. Advanced Active X controls - Tree view and List view control Rich Text Box control, Ms Flex Grid control.

**UNIT IV**

**Programming Basics** - Visual Basic data types, variables - naming and declaring variables, types, constants, operators - Arithmetic, Relational and logical operators, Handling keyboard and Mouse Input in programs.
**Arrays -** Declaring arrays, static array, Dynamic array, multi-dimensional array and control array.
**Modules -** Form module, standard module, class module working with subprocedures and function procedures, Built-in functions.

**UNIT V**

**Program Flow Control -** Working with conditional statements - If .... Then, If Then Else if, Nested If, select case, working with looping concept - For.. .Next, Do... .While, Do.... Until, While.. ..Wend, Nested loops.

**Drawing with Visual Basic** - Co-ordinate systems, Graphics controls, Graphics controls, Graphics methods, specifying colors, Processing Images.

**Database Basics** - Creating a database in Visual Basic, creating a user interface using ADO Data control, Data report.

**REFERENCE**

1. T.Karthikeyan, P.C.software for Office Automation (Ms-Office), for private circulation, Gobi Arts and Science College, Gobichettipalayam, Erode, July 2002.
2. Curtis Frye, "Microsoft Access Version 2002, Plain and Simple", Printie — Hall of India, Private Limited, New Delhi — 110 001, 2001.
3. Craig Eddy and Timothy Buchanan, "Microsoft Access 2000 in 24 hours"; Techrnedia publications, 1999.
4. Alan Simpson, Celeste Robinson, "Mastering Access 2000", BPB publications, 1999.
5. Susan Sales, harkins, Ken Hansen, MCSD, Tom Gerhart, "Using Microsoft Access 2000", Prentice Hall of India, Private Limited, 1999.
6. Garry cornell — "Visual basic 6 from the Ground up", TMH, 1999.
7. Steve Brown, Visual Basic 6-In Record Time", BPB publications, 1998.
8. Brain siler and Jeff spotts, "Using Visual Basic 6", Special Edition, Prentice -- Hall of India, Private Limited, New Delhi — 110 001, 200L
9. Evangelos Petroutsos, "Mastering Visual Basic 6", BPB publications, 1998.

Practical Knowledge I Activity

1. Creating a nutrition related database in Access and in Visual Basic
2. Applying different types of queries
3. Creating a form for patient details for any one disease
4. Creating a simple software in nutrition.

**SEMESTER III**
**ELECTIVE GROUP A**
**PAPER III**
**FOOD QUALITY CONTROL**
**Hours of instruction/week: 3**

**Subject Description:**
This paper presents the principles of quality control, food laws, food standards, critical points for hazard analysis, food patents.

**GOALS:**
To enable students to learn and gain awareness on food laws, standards and aspects of food safety.

**OBJECTIVES:**
To enable students
1. To gain knowledge on food safety & food laws
2. To study about quality control & common food standards.

**UNIT I**
**Quality control** – Objectives, Importance, functions of quality control, Stages of quality control in food industry.
**Food quality assurance** – Design of company quality assurance program, Microbiological concerns.
Managing quality in supply chain and marbeting of food products.

**UNIT II**
**Government regulations in quality control** – FAO/WHO codex Alimentarious commission, FSSAI, PFA, AGMARK, BIS, FPO, fair average quality (FAQ) specification for food
grains, ISO 9000 series.
**HACCP** – background, current status, structured approach, principles, benefits and limitation.
Consumer Protection Act (CPA)

**UNIT III**
**Role of Central and State Government in imparting quality control** – WHO assisted activities – Role of control food laboratory and state food laboratories. Qualification and duties of public analyst and food inspector.

**UNIT IV**
**Food standards** – cereals & products – bread, biscuits, cakes, pasta products.
**Fruit products** – jam, juices, squashes, ketchup, sauce,
**Oils & fats** – coconut oil, groundnut oil, palm oil, sunflower oil, vanaspati.
**Milk & products** – Skimmed milk powder, partly skimmed milk powder, condensed sweetened milk. Other products-coffee, tea, sugar, honey, toffees.
**Patent** – definition, requirements, patent laws in India, administrator, need for patent system, advantages, precautions to be taken by applicants, patent procedures, non-patenable.

**UNIT V**
**Food safety** – meaning of food safety.
**Importance of food** quality and safety for developing countries.
**Food hazards** – Physical, Chemical, Biological hazards associatedwith foods – types.
Effect of processing and storage on microbial safety.

**Types of food toxicants** – Endogenous, natural, synthetic toxicants.

**REFERENCES:**

1. A first course in food analysis – A. Y. Sathe, New Age Publications, 1999.
2. Food Science – Norman. N. Potter & Joseph. H. Hotchkiss, CBS Publishers, 1996.
3. Food Science, Chemistry & Experimental foods – M. Swaminathan, Bappco Publishers.
4. BIS standards.
5. Technology of food preservation – DesrosierAndDesrosier ,CBS Publishers,Fourth edition,1999.
6. Indian food Industry.
7. Processed food Industry.