DEPARTMENT OF HOME SCIENCE
KURUKSHETRA UNIVERSITY KURUKSHETRA

P.G Diploma in Nutrition & Dietetics
w.e.f. 2013-14

Sr. No.	Paper No.	Title of Paper	M. Marks	Time
1.	I	Human Nutrition & Biochemistry	80+20*	3 hrs
2.	II	Human Physiology	80+20*	3 hrs
3.	III	Food Microbiology and Hygiene	60+15*	3 hrs
4.	IV	Life Science (Lab.)	50	3 hrs
5.	V	Management of Food Service Organization	80+20*	3 hrs
6.	VI	Management of Food Service Organization (Lab.) Practical (Internal Evaluation)	50	3 hrs
7.	VII	Public Health Nutrition	80+20*	3 hrs
8.	VIII	Public Health Nutrition (Lab.) Practical	75	3 hrs
9.	IX	Dietetics - I	60+15*	3 hrs
10.	X	Dietetics – II	60+15*	3 hrs
11.	XI	Dietetics – (Lab) Practical	100	3 hrs
		Assignment & Seminar**	50	
		Internship (Viva Voce & Report)	50	
			Total	**1000**

* Internal Assessment
**To be evaluated internally by teachers.

Human Nutrition and Biochemistry (Theory)

Paper: I

M. Marks: 100
Theory Exam: 80
Int. Assessment: 20
Exam Duration: 3 hrs

NOTE:

- Examiner will set nine questions in all
- All the questions will carry equal marks
- Question No. -1 will be compulsory consisting of 5-10 short type questions and spread over the entire syllabus
- The remaining eight questions will be set from units I & II, four questions from each unit.
- The candidates are required to attempt five questions. Question No -1 will be compulsory, remaining four questions will be attempted by selecting two questions from each unit.

Unit-I

1. General body composition and methods of determining body composition, factors affecting body composition
2. Water and electrolyte balance.
3. Energy: - gross and physiological fuel value; requirements –methods of assessment; factors affecting energy requirement.
4. Carbohydrates: – nutritional significance and requirements, Glycolysis, TCA cycle, Glycogenesis, Glycogenolysis, gluconoegenesis, Hexose monophosphate pathway

5. Fats: Nutritional significance, essential fatty acids and requirements of fats, Beta-oxidation of fatty acids, *de novo* synthesis of fatty acids, cholesterol biosynthesis and degradation

Unit –II

6. Proteins: nutritional significance, requirements – factors affecting, methods of assessing and recommended intakes for different physiological stages. Protein quality –methods of evaluation; improvement of protein quality. Amino acid imbalance, clinical importance of branch chain amino acids and aminocids toxicity, Urea cycle.
7. Nucleic acids: biosynthesis and inhibitors
8. Inborn errors of metabolism
    a. Protein metabolism – Alcaptonuria, Tyrosinosis, phenyIketonuria, albinism, arginemia, citrullinuria, Homo-cystinuria, histidimia, Primary hyperoxaluria, cystinuria and cystinosis, maple syrup urine disease.
    b. Carbohydrate metabolism – Fructosuria, Galactosemia, Pentosuria, Glycogen Storage diseases.
    c. Lipid Metabolism – Gaucher's disease, Niemann-Pick disease, Tay sach's disease.

9. Minerals: functions, requirements of macro and micro minerals.
10. Vitamins: Nutritional significance requirements, effect of low and excess intake of fat and water soluble vitamins:

REFERENCE:

- Murry, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (1993): 23rd E Harper's Biochemistry. Lange medical book.
- Lehninger, A.L, Nelson, D.L. and Cox, M.M. (1993): 2nd Ed. Principles of Biochemistry, CBS Publishers and distributors
- Devlin, T.M. (1986): 2nd Ed. Text book of biochemistry with Clinical Correlations, john Wiley and sons.
- Stryer, L. (1995): Biochemistry, Freeman WH and Co
- Modern Nutrition in; Health and Disease – Goodhearth, R. S.
- Recommended dietary allowance for Indian – I.C.M.R., 1980
- Nutrition and Development- Winick 1973, Univ. of Calombia.
- Biology of Nutrition – Eclames 1972, Palaniuma Press
- Foods & Nutrition – Krause 1972, Saunders.
- Nut. & Physical; fitness-BoGert L.J.
- Principles of Nut. – Wilson, L.D. and Fisher. K.H.
- Nutrition in Health & Disease – Cooper, L. Barher, L. Mitehell, Hand Rynheraen.
- Nutrition A comprehensive: Beaton and McHanery, Treatise Vol-1, II, & III.
- Human Nut. & Dietectics- Davidson S., Passmore, R., Brook, J.E. and Truswell.
- Trace Elements in Human and Animal Nut. – Underwood, N.Y.
- Essays in Biochemistry – Samul Graff, Tandon Book Dept. Sec. –16

Human Physiology (Theory)

Paper-II

M. Marks: 100
Theory Exam: 80
Int. Assessment: 20
Exam Duration: 3 hrs

NOTE:

- Examiner will set nine questions in all
- All the questions will carry equal marks
- Question No. -1 will be compulsory consisting of 5-10 short type questions and spread over the entire syllabus
- The remaining eight questions will be set from units I & II, four questions from each unit.
- The candidates are required to attempt five questions. Question No -1 will be compulsory, remaining four questions will be attempted by selecting two questions from each unit.

Unit-I

1. Human body- cells, tissues, their types and functions
2. Blood cells: – Composition, formation, their functions and normal values
3. *Cardio-vascular system:* basic properties of the heart, conduction system of heart, cardiac cycle**,** cardiac output, blood pressure and factors affecting it, hypertension – types and the mechanism of development, *ECG.*
4. Kidney: functions of kidney, mechanism of urine formation
5. Physiology of gastro intestinal tract: Physiology of digestion, secretions of alimentary canal and digestive glands. Absorption of nutrients (amino acids, lipids, carbohydrates etc.)

Unit –II

6. Respiratory system: External and internal respiration, exchange and delivery of gases-mechanism and factors affecting it. Regulation of respiration.
7. Normal body temperature and the mechanism by which it is maintained
8. Mechanism of detoxification in human body
9. Endocrine system: Chemical classes of hormones, mechanism of action of hormones, functions of hormones released by pituitary, hypothalamus, thyroid, parathyroid, adrenal medulla and cortex, pancreas, disorders due to hypo or hyperactivity of above said glands.
10. Physiology of reproduction: primary sex organs and hormones of male and female, gametogenesis, physiology of menstruation, pregnancy and lactation.
11. Sensory system – Physiology of vision, taste, smell and hearing.
12. Nervous system – Major divisions of nervous system and their functions composition and functions of cerebrospinal fluid, EEG.

Books Recommended:

- Stand, F.L. Modern Physiology the Macmillan Company Latest Ed.
- Guyton, A.C. Text Book of Medical Physiology W.S. Saunders
- Davidson, B. and Smith E., Text book of Physiology and Biochemistry, 1972 (8^{th} Ed.).
- Human Physiology – A.J. Vander
- Principles of Anatomy and Physiology – Anagnastakes.
- Text Book of Physiology – Pattean
- Bloom W. & Favcott. D.W.A. – Text Book of Histology, W.B. Saunders and Company

Food Microbiology and Hygiene

Paper-III

M. Marks: 75
Theory Exam: 60
Int. Assessment: 15
Exam Duration: 3 hrs

NOTE:

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- All the questions will carry equal marks
- Question No. -1 will be compulsory consisting of 5-10 short type questions and spread over the entire syllabus
- The remaining eight questions will be set from units I & II, four questions from each unit.
- The candidates are required to attempt five questions. Question No -1 will be compulsory, remaining four questions will be attempted by selecting two questions from each unit.

Unit-I

1. History of microorganisms in food
2. Microorganism important in foods (Bacteria, fungi and viruses): their classification, morphology, growth and reproduction
3. Cultivation and destruction of microorganisms (sterilization and disinfections).
4. Foods from microorganisms: fermented foods and single cell proteins.
5. Indices of food, milk and water sanitary quality. Microbiological criteria of foods, water and milk testing (bacteriological analyses) standards of foods.

Unit-II

6. Food spoilage: source of contamination, factors responsible for spoilage and chemical changes due to spoilage.
7. Contamination and microorganisms in spoilage of different kinds of foods: cereal and cereal products, sugar and its products, vegetable and fruits, fish and other sea foods, egg and poultry milk and milk products, cannel foods, meat and meat products
8. Prevention of spoilage -principles of common techniques applied to above-mentioned groups of foods.
9. Food hazards: food borne infections, food intoxication – symptoms and methods of prevention, investigation of food borne disease outbreak.

Books Recommended

- General Microbiology – Powar
- Good Microbiology – Frazier and Westhoff
- Microbiology – Prescott, Harley, Klein
- Food Microbiology – Adams
- An Introduction of Microbiology _ P. Tauro
- General Microbiology - Stanier
- Food Microbiology – James M. H Jay
- Food Hygiene, microbiology & HACCP – 3rd edition – S.J. Forsythe & P.R.
- Hayes

Life Sciences (Lab)

Paper-IV

M. Marks: 50
Exam Duration: 3 hrs

- Enumeration of RBCs.
- Enumeration of WBCs
- Estimation of Hb.
- Clotting time determination
- Determination of blood group
- Microscopy: principles, use and maintenance.
- Staining techniques: simple, grams, sporo and acid fast staining of bacteria, staining of molds and yeasts.
- Preparation of common laboratory, Media for cultivation of bacteria, yeasts and molds.
- Isolation of bacterial yeasts and molds by plating:
  1. Streaking 2. Dilution techniques
  Motility of bacteria by hanging drop method
- Preparation of slide-culture of molds.
- Morphological identification of common bacteria (cocci, bacilli and spiral) , "Molds", yeasts (Saccharomyces and candida) in food spoilage (slides and cultures)
- Water analysis –Demonstration only
  Milk analysis – Demonstration only
  Food analysis (canned) – Demonstration only
- Identification of food animal parasites (Entamoeba, Tapeworms, pinworms and roundworms) – slides and specimen
- Qualitative estimation of carbohydrates

- Quantitative estimation of following:
  - Glucose from serum/foods.
  - Proteins by biuret/Lowry/microkjeldahl method
  - Cholesterol from serum/foods by cold method
  - Vit. C by dye method
  - β-Carotene

Management of Food Service Organization

Paper - V

M. Marks: 100
Theory Exam: 80
Int. Assessment: 20
Exam Duration: 3 hrs

NOTE:

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- All the questions will carry equal marks
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- The remaining eight questions will be set from units I & II, four questions from each unit.
- The candidates are required to attempt five questions. Question No -1 will be compulsory, remaining four questions will be attempted by selecting two questions from each unit.

Unit-I

1. Review of commercial and non-commercial food service organizations and their development.
2. Fundamentals of management: principles functions and tools of management, Management of resources
3. Meal planning in institutions: basic factors in institutional meal planning, Menu – types of menu, menus for different commercial and non-commercial organizations (Hospital, Club, Industrial and Institutional Canteen, Prison, Hotel, Hostel, Orphanage, and Transport)
4. Space and equipment: planning and organization for kitchen, stores and service areas
5. Food Purchasing and inventory management : food purchasing, receiving, storing, issuing and inventory management

Unit-II

6. Food Production and service: Production planning, methods of food production, types of food and beverage service, clearing, cleaning and waste management.
7. Personnel Management: Manpower planning, employment, training, motivation, welfare policies and labour laws
8. Financial Management: Costing and budgeting, pricing, food and beverage cost control, maintenance of accounts
9. Marketing and sales promotion: Advertising, merchandising and market promotion.
10. Hygiene, Sanitation and Safety: Food Hygiene, environmental sanitation, control of infestation and personal hygiene, prevention of accidents. Safety and security laws.

Books Recommended

- Food Service in Institutions – Wood
- Food Service in Institutions – West, Bessin, Brooks.
- Handbook of Food Preparations – A.M. Home Economics Association.
- Food Selection and Preparations – Sweetman, M.D., 4, Mackeller.
- School Lunch Room Service – Oliver B. Watson.
- Food service Planning: layout Equipment – Lender H. Ketshevar and Marget E. Terrel.
- Human Nutrition and Dietetics – Davidson and Passmore

Management of Food Service Organization (Lab.) Practical

Paper- VI

M. Marks: 50
Time: 3 hrs

***Internal evaluation of 50 marks and would be adjudged by teachers of the Department**

1. Visits to hospitals, hostels, hotels and cafeterias
2. Planning menus and preparing indent for quantity:
    - Banquet
    - Fast food outlets
    - Packed meals
    - Restaurant
    - Transport catering
    - Hospitals
    - Cafeteria
3. Standardizing recipes for quantity cookery

4. Cost analysis of menus in
    - College canteen
    - Hostel mess
    - Hospital (private, charitable, government)
5. Analysis of food safety and hygiene
6. Arranging Cafeterias

Public Health Nutrition

Paper - VII

M. Marks: 100
Theory Exam: 80
Int. Assessment: 20
Exam Duration: 3 hrs

NOTE:

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- The remaining eight questions will be set from units I & II, four questions from each unit.
- The candidates are required to attempt five questions. Question No -1 will be compulsory, remaining four questions will be attempted by selecting two questions from each unit.

Unit-I

1. Concept of health, nutrition and public health nutrition. Scope of public health nutrition and role nutritionists in health care delivery system.
2. Food Production, consumption and availability in India and factors affecting: socio-economic, cultural and other factors (food habits, prejudices, food waste, distribution and storage.)
3 Malnutrition causes, consequences and impact on national development
4 Etiology, prevalence, clinical manifestations, preventive and therapeutic measures; and measures to combat following major nutritional problems: PCM;Vitamin A deficiency; nutritional anemia ;, Iodine deficiency; Vitamin D and calcium imbalance (rickets, osteomalacia, osteoporosis); fluorosis; beri-beri; pellagra; lathyrism

Unit-II

5 Assessment of nutritional status by the following techniques as well as their merits and demerits:
   a) Dietary survey
   b) Biochemical
   c) Clinical
   d) Anthropometry
   e) National and inter national organizations /programs for the improvement of nutritional status of the community.

6 Nutrition Education: Importance of nutrition education for the community, techniques, methods and evaluation

7 Principles of planning, executing and evaluation of nutrition education programmes

8 Food Adulteration: Laws governing the food standards, common methods of detecting food adulteration at home. Detection of common food adulterants

Books Recommended:

- Nutritional evaluation of food processing, Roberts Haris John willy & Sons, N.Y. London.
- Nutrition and Physical Fitness: Bogrert, L.J.
- Nutrition in India: V.N.
- Human Nutrition- M.C. Durtt, Maxine
- Applied Nutrition- Rajalakshmi-R.
- Biology of nutrition – Elements 1972, Platinum Press

Public Health Nutrition (Lab.) Practical

Paper - VIII

M. Marks: 75
Exam Duration: 3 hrs

1. Development of low cost recipes for infants, preschoolers, elementary school children, adolescents, Pregnant and lactating mothers. Planning of cyclic menus for *balwadis*/nursery school, mid-day snack/school lunch.
2. Diets during deficiency diseases – PEM, anemia, multiple vitamin deficiencies.
3. Survey: Dietary surveys and assessment of nutritional status.
4. Nutrition Education.
   Demonstration: preparation of teaching aids.

5 Visits to the on going public health nutrition programmes.

Dietetics – I

Paper - IX

M. Marks: 75
Theory Exam: 60
Int. Assessment: 15
Exam Duration: 3 hrs

NOTE:

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- The remaining eight questions will be set from units I & II, four questions from each unit.
- The candidates are required to attempt five questions. Question No -1 will be compulsory, remaining four questions will be attempted by selecting two questions from each unit.

Unit-I

1. Principles of therapeutic nutrition;
2. Factors in patient care, counseling and coordinated nutritional services for the patient. Feeding the patient – psychological aspects, assessment of patient needs and role of dietitian in feeding of patients
3. Therapeutic adaptations of the normal diets- regular diets, modifications in diet consistency, energy, and nutrients; special feeding methods: enteral and parenteral feeding
4. Incidence, etiology, clinical manifestations, complications, dietary management and counseling for the following disorders:
   a) Upper gastrointestinal tract
   b) Small intestine
   c) Large intestine

Unit-II

5. Incidence, etiology, clinical manifestations, complications, dietary management and counseling for the following disorders:
   d) Liver ,gall bladder, biliary tract, pancreas:jaundice and infectivr hepatitis, cirrosis of liver, hepatic coma, cholecystitis, cholelithiasis, acute and chronic pancreatitis , infantile biliary cirrhosis
   e) Cardiovascular: Arteriosclerosis, ischemic heart disease, congestive heart failure, myocardial infarction, hypertension.
   f) Renal : glomerulo nephritis, nephritic syndrome , acute and chronic renal failure, urolithiasis, dialysis

Books Recommended:

- Mal-Nutrition and the Eye: Donala Sterart Mclaren, Academic Press, New York and London.
- Diabetes Mellitus: Williames and Wikins Co., USA
- Nutrition and Physical fitness: Bogert, L.J.
- Human Nutrition Mc Durtt, Maxine
- Applied Nutrition – Rajalakshmi, R.
- Hand boom of diet therapy: Dorothea, Turner.
- Human Nutrition and dietetics- Davidson, S. Passmore, R. Brock- J.F. and Turswell A.S.
- Clinical Dietetics and Nutrition - Anita, F.P.
- Food Science and Technology: Pyke, Maonus.
- Modern Nutrition in health and disease by Goodhearth R.,S. Shills.

Dietetics –II

Paper - X

M. Marks: 75
Theory Exam: 60
Int. Assessment: 15
Exam Duration: 3 hrs

NOTE:

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- The candidates are required to attempt five questions. Question No -1 will be compulsory, remaining four questions will be attempted by selecting two questions from each unit.

Unit-I

1. Incidence, etiology, clinical manifestations, complications, dietary management and counseling for the following disorders; dietary management during metabolic disorders
   i) Diabetes mellitus
   ii) Gout and arthritis
   iii) Inborn errors of metabolism:
      - Phenylketonuria
      - Fat intolerance
      - Glucose Intolerance
      - Galactosemia

2. Causes, problems, prevention and dietary management during following conditions:
   i) Weight imbalance: under, over
   ii) Febrile : acute & chronic fever
   iii) Surgery and burns.
   iv) Infections
3. Diet management during Cancer and AIDS.
4. Allergy: detection, causes, problems, prevention and dietary management

Unit-II

5. Diets throughout the life cycle: (a) Infancy (b) Childhood (c) Adolescence (d) Adults (e) Old Age (f) Pregnant and lactating mothers
6. General principles of pediatric nutrition.
7. Nutrition management in special conditions: space travel, high altitude/low temperature, floods and famine, heavy manual labour in tropical climate, armed forces.
8. Clinical manifestations, complications and dietary management in alcoholism

Books Recommended

- Mal-Nutrition and the Eye: Donala Sterart Mclaren, Academic Press, New York and London.
- Diabetes Mellitus: Williames and Wikins Co., USA
- Nutrition and Physical fitness: Bogert, L.J.
- Human Nutrition Mc Durtt, Maxine
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- Human Nutrition and dietetics- Davidson, S. Passmore, R. Brock- J.F. and Turswell A.S.
- Clinical Dietetics and Nutrition - Antia, F.P.
- Food Science and Technology: Pyke, Maonus.
- Modern Nutrition in health and disease by Goodhearth R.,S. Shills.

Dietetics (Lab) Practical

Paper - XI

M. Marks: 100
Exam Duration: 3 hrs

1. Planning, calculation, preparation, service, evaluation of therapeutic diets covered in theory for papers IX, & X
2. Dietary counseling of the patients for the disorders covered in theory. Each student should do a minimum of two case histories.