**DEPARTMENT OF HOME SCIENCE**

**KURUKSHETRA UNIVERSITY KURUKSHETRA**

Ph. D. in Home Science (Foods & Nutrition)

Syllabus for Entrance Examination w.e.f. 2019-20

***Note to the Examiner****:-*

1. *The examiner will set multiple choice objective Question paper consisting of 100 Questions of 02 Marks each.*
2. *There will be no negative marking.* No marks will be given for unanswered questions
3. *The objective paper should be distributed evenly over the entire syllabus.*

***Maximum Marks****:- 200* ***Time:-*** *02.00 Hours*

**Food Safety and Quality Control & Food Toxicology:-**

1. Microbial Problems in Food Safety including Mycotoxins and viruses, International Direct Additives, Indirect Additives, Residues and Contaminants, Naturally occurring toxicants & food contaminants, Shelf life of Food Products, Food additives, Recent concerns on food safety, Food processing, Food laws and regulations, Organizations and agreements, Food safety and quality management systems, Latest Trends in different types in Food Packaging, Food labeling.

**Nutritional Bio-Chemistry:-**

1. **PRINCIPALS OF BIOENERGETICS**- Concept of free energy, high energy compounds (ATP, PEP, and Phosphogens), role of ATP/ADP cycle in transfer of high energy phosphates,

b). **Carbohydrates, Lipids and Amino Acids And Proteins**:- Structure, stereoisomerism (DL and RS systems) and Properties, glycolysis ,Citric acid cycle, Hexose monophosphate shunt, glycogenesis, glycogenolysis, gluconeogenesis, Structure and Properties, Beta- oxidation of saturated and unsaturated fatty acids, de novo synthesis of fatty acids, biosynthesis and breakdown of cholesterol, triacylglycerols, Phospholipids, ketone body formation and their utilization, Biological role of proteins, classification of proteins, levels of protein structure- primary, secondary, tertiary and quaternary structure, forces stablizing protein structure, denaturation of proteins, Transamination, deamination, urea cycle

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1. **ENZYMOLOZY**- classification and nomenclature, Enzyme kinetics, Bisubstrate reactions, Mechanism of enzyme action, Enzyme inhibition, regulation of enzyme activity, isoenzymes, applications of enzymes in medicine and food industry.
2. **MECHANISM OF ACTION OF HORMONES.**
3. **NUCLEIC ACIDS**- Nitrogenous bases, experimental proof of DNA and RNA as genetic material, double helical model of DNA (A, B and Z), types of RNA and their functions, Biosynthesis and breakdown of purines and pyrimidines, DNA replication, transcription, translation (prokaryotes), regulation of gene expression (Prokaryotes), recombinant DNA technology and genetically modified foods, nutritional regulation of gene expression.
4. **Nutrigenomics, Nutraceuticals & Bioactive compounds**.
5. **Electron transport chain and oxidative phosphorylation**
6. **Metabolism of xenobiotics.**
7. **BIOPHYSICAL TECHNIQUES**- Chromatography, Electrophoresis, Spectrophotometry, Immunochemical Methods – RIA, ELISA.

**FOOD SERVICE MANAGEMENT:-**

Characteristics of commercial and Institutional catering service Principles, functions and tools of Institutional food Management. Personal Management:- (i) Recruitment (ii) Selection (iii) Orientation, (iv) training and motivation, Labor laws and welfare policies, Types and layout of kitchen and service area, Selection and Management of equipment, Management and sources of Budget. Types of cost accounting and analysis. Types and steps in menu planning and food service in commercial and non-commercial unit. Purchasing, Receiving and Issuing process in Food Management System. Layout, store records and Inventory Management in food storage. Food production Management in large quantity cooking and holding of foods. Marketing, sales analysis and market promotion .Types of accidents, preventions and General safety rules. Hygiene, sanitation, food standard and waste disposal in food service management.

**PHYSICAL FITNESS AND SPORTS NUTRITION:-**

Concept of physical fitness, assessment criteria and management of health status. Self management skill of healthy life style. Body composition, energy input and output doing exercise and sports. Pre game meal, post game mean and diet manipulation in sports. Water and electrolyte balance doing exercise and sports events. Diet with high energy requirement (stress, fracture and injury). Special nutrition for female, older and disabled athletes. Role of Yoga, Meditation, Vegan and Traditional Diets in Health and Fitness Nutrition education of athletes and coaches.

**FOOD SCIENCE:-**

1. Relation of cookery to colloidal chemistry: Definition of colloidal system, altering degree of dispersion, Hydrophilic and Hydrophobic colloids, stabilization of colloidal systems, properties i.e. surface tension, adsorption, foam formation, rheology, gel, formation and emulsions.

Starch Cookery-Sources, types and uses of starch, gelatinization, Flours- Composition and baking qualities. Batters and dough , Leavening agents: biologically and chemically leavened products, cooking and parboiling of rice,Sugar Cookery: Sources, types, uses and properties of crystallization of sugar, stages of sugar cookery, fondant, fudge, caramel and brittles.

1. Fats and Oils: Sources, composition, physical & chemical properties and cooking uses of fats and oils. Fat substitutes. Changes during storage, fat deterioration and antioxidants, Nuts and Oilseeds: Composition, Oil extraction and by-products, Beverages: Classification and types of beverages. Some major beverages such as coffee, tea, cocoa, malted drinks, Spices and Condiments: Composition, flavoring extracts – natural and synthetic, Sensory Evaluation: Sensory characteristics of food, objective and subjective evaluation. Fermentation technology, enrichment and fortification technology, Vegetables and Fruits: Composition, texture, pigments and acids in vegetables and fruits, browning reaction. Pectic substances: Characteristics, uses, theory of pectic gel formation, testing of pectin, factors affecting jelly formation.

c) Grams and Dhals: Composition, methods of processing and cooking, Effect of processing such as roasting, parching, soaking, germination and fermentation. Toxins in pulses, Milk and Milk products: Composition and constituents of milk. Milk types. Coagulation of milk protein. Setting of curds, different types of cheese, Dairy products: Cultured milk, Yogurt, Butter, Whey, Concentrated and dried products, frozen desserts, dairy product substitutes, Eggs: Structure, composition and selection. Changes during storage. Coagulation of eggs protein. Egg types. Eggs cooked in shells, poached eggs, omelets. Low cholesterol egg substitutes.

Meat: Structure, constituents of meat, post-mortem changes. Processing and preservation and their effects. Heat-induced changes in meat, tenderness and juiciness, Fish and sea food: Types and composition, Storage and changes during storage, preservation, byproducts and newer products.

**CLINICAL DIETETICS:-**

1. Therapeutic modification of the normal diet:-Principles of Diet therapy, Routine Hospital diet, Diet modifications for therapeutic care, Enteral and Parenteral nutrition Nutrition in surgical conditions: pre and post operative Etiology, clinical aberrations, prevention and nutritional management of:- Infection, Fever (Acute and chronic),Food Allergy, Metabolic Stress, Burns ,Arthritis, Osteoarthritis, Gout, Rheumatoid, arthritis Gastro intestinal tract disorders: Peptic ulcer, Diarrhea, Constipation Malabsorption syndrome: Carbohydrates, Fat and Lactose intolerance, Sprue and Celiac disease. Liver: Jaundice, Infective hepatitis, Cirrhosis, Hepatic failure Pancreas: Pancreatitis – Acute and Chronic Gallbladder: Gallstones, Glomerulonephritis, Nephrotic syndrome, Acute renal failure, Chronic renal failure, Renal stones. Weight imbalances (over and under nutrition),Diabetes mellitus,
2. Nutrition Therapy management in:-AIDS, Cancer. Nutrition management in special conditions: Space travel, High altitude/ Low temperature, Heavy manual labour in tropical climate. Chronic alcoholism: Effect of Alcohol on digestion and absorption, Alcohol nutrient interaction ,Dietary management. Inborn errors of metabolism**:** Phenylketonuria, Galactosemia, Alkaptonuria, Cardiovascular disorders: Hypertension, Atheroscelerosis, Coronary heart disease

**Public Health Nutrition:-**

1. Prevalence, etiology, biochemical and clinical manifestation and preventive measures for Protein calories Malnutrition, Beri-beri, Scurvy, Vitamin A deficiency, Iodine deficiency, Pellagra, Nutritional Anemia, Fluorine Deficiency and Toxicity, Rickets, Osteomalacia, Osteoporosis
2. Nutrition surveillance and planning, National nutrition Policy, Assessment of Nutritional status of the Community, Nutritional Programmes for improvement of Nutritional status, Nutrition Education

**HUMAN NUTRITION:-**

a). Role of Carbohydrates, lipids, Proteins and micronutrients (Vitamins and minerals) in human health and diseases.

b) Recommended daily allowances of macro and micro nutrients during different stages of life.

c) Nutrient Nutrient interrelationships and drug nutrient interaction.

d) Direct and indirect methods of determination of energy, Body composition, physiology of hunger and eating disorders.

**RESEARCH METHODS & STATISTICS:**-

Sampling: Meaning, importance and types: Random (simple, systemic, stratified, cluster, two stages and multi stage) Non-random (incidental, purposive, quota, snow ball). Data gathering Instruments: Interview, Observation, Questionnaire, Rating scale, Reliability and validity of measuring instruments. Analysis of data and research report.

Statistics : Meaning, frequency, frequency distribution and its type.

Parametric and Non parametric test. Normal distribution, Measure of central tendency: Mean, medium, mode. Measure of dispersion: Range, mean deviation, standard deviation, skewness and kurtosis. Chi – square test T-test: Single mean, independent mean, paired mean. Correlation and coefficient of correlation Analysis of variance: One way and two way classification Software related to Home Science