

# M.Sc. FOOD & NUTRITION

## PROGRAM OVERVIEW

Era University offers UG and PG courses in Food & Nutrition. These programs have specifically been designed to meet the increasing demands of dietitians in hospitals, health care centers and technical personnel in food industries. The main emphasis of the course is to teach Basics of Food & Nutrition, Applied Nutrition, Therapeutic and Clinical Dietetics and Scaling of Food Products Production, Management, Preservation and Entrepreneurship. The programs focus on the interface between Human Nutrition and Food Science as well as an integration of multiple disciplines. It is designed to provide students with a thorough understanding of food science and nutrition, encompassing all aspects of food processing, preservation, storage, quality assurance, and long-term nutritional implications. In addition to basic Food and Nutrition studies, the curriculum includes elective courses in Human Development, Extension Education, Human Resource Management, Research and Biostatistics, and Computer Sciences. Students can select any two elective courses in each semester. The program is suitable for those also who have a keen interest in Food & Nutrition, and can dedicate ample time to food research. Candidates with an inquisitive mind and diligent team players passionate about health and fitness are a good fit for this program.

### ELIGIBILITY

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### COURSE DURATION

### PROGRAM OBJECTIVES

- To learn the methods of assessing human nutritional requirements, anthropometric assessment and diet planning
- To apply theoretical concepts in laboratory setting as per requisite standard
- To understand the applications of nutritional sciences in clinical interventions, communication for health promotion, food service management, food science and processing
- To improve understanding and develop skills for planning, management and monitoring of public health nutrition programs implemented by the government
- To acquire skills to undertake systematic research in the area of food science, clinical nutrition and public health nutrition

### PROGRAM OUTCOMES

The program trains students to become professionals who can work as public health nutritionists, dietitians and food scientists. After completing this program the students will be able to:

- Assess nutritional status and plan appropriate diets
- Use the knowledge of nutritional sciences in clinical interventions and communication for health promotion
- Manage a food service establishment
- Apply theoretical concepts and practical training for research in the field of food science, clinical nutrition and public health nutrition

### CAREER PATHWAYS

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SUBJECTS TAUGHT IN M.Sc. (FOOD & NUTRITION)

## CURRICULUM OVERVIEW

### CORE COURSES – (COMPULSORY)

#### FIRST YEAR -SEMESTER-I

##### ADVANCES IN FOOD SCIENCE

Basic Components of Food (Carbohydrates, Proteins, lipids, Minerals, Fibers, Antioxidants and Vitamins) ▪ Physical and Physiological Changes in Food ▪ Osmotic Pressure, Enzymatic Browning of Immobilized Enzymes ▪ Enzymes in Food Processing ▪ Denaturation of Proteins ▪ Pigmentation of Colors in Food and other related topics

##### ADVANCED NUTRITION

Concept of Body Composition ▪ Levels of Body Composition ▪ Body Composition Techniques ▪ Measurement of Body composition by Nutritionist ▪ Techniques of Measurement ▪ Calculation of preventing body water and body fat from body density ▪ Dilution Technique and Calculation of Indices of Body Composition ▪ Concept of Body Cell Mass ▪ Methods of evaluating protein quality ▪ Protein and Amino Acid Requirements ▪ Therapeutic Applications of Specific Amino Acids ▪ Role of Branched Amino Acids ▪ Nutrition, Immunity and Infection ▪ Nutrition & Stress food and other associated topics

##### HUMAN ANATOMY & APPLIED PHYSIOLOGY

Definition of Anatomy and Physiology ▪ Parts of Human Body, Anatomical positions, Anatomical terms, Planes & Sections ▪ Body cavities, Cell Structure & Functions ▪ Digestive System, Excretory System, Respiratory System Circulatory System, Endocrine system, Musculoskeletal System ▪ Male and Female Organs of Reproduction and Physiological changes during Pregnancy ▪ Nervous System and other related topics.

#### FIRST YEAR: SEMESTER-II

##### ADVANCED NUTRITIONAL BIOCHEMISTRY

Metabolism of Major Food Components: Carbohydrates, Fats And Proteins ▪ Intermediary Metabolism of Carbohydrates and its Regulation ▪ Glycolysis, TCA-cycle, HMP-shunt Pathway, Glyoxalate Cycle, Gluconeogenesis & Glycogenesis and other related chapters

##### FOOD PROCESSING TECHNOLOGY

Physical and Chemical Principles in Food Processing Operations ▪ Food Deterioration,

Methods of Preservation by Sugar, Salts, Smoke, Acid And Chemicals ▪ Processing: Thermal Processing, Refrigeration, Freezing, Dehydration, Ionizing Radiations & various other related topics

### **FOOD MICROBIOLOGY & TOXICOLOGY**

Microorganisms of Importance in food - their classification, viruses, bacteria, fungi, algae, parasites ▪ their morphology, growth and reproduction, industrial importance, factors affecting growth of microbes, danger zone, useful and harmful microbes ▪ Role of Microbes in Fermented and Genetically Modified Foods and other assignments related to food microbiology

### **SECOND YEAR -SEMESTER-III**

#### **FOOD TOXICOLOGY & FOOD SAFETY**

Toxicants naturally occurring in foods ▪ Lathyrogens, Hemagglutinins, Ackee Fruit Poisoning, Presser Amines, Fungal Toxins, Seafood Toxins, Toxicants of natural spices and flavors ▪ Toxic substances found in certain food fats ▪ Cyanogenetic Glucosides, Tumerogens and Carcinogens, Goitrogens, Radioactive materials in food ▪ Definition of Adulterated Food, Food Standards, Common Adulterants in different food ▪ Contamination of foods with toxic chemicals, pesticides and insecticides ▪ Contamination of foods with harmful microorganisms and animal additives ▪ Contamination in Sea food and other associated topics with respect to food toxicology & food safety

#### **THERAPEUTIC NUTRITION-I**

Therapeutic Adaptations of Normal Diets; Methods of feeding patients ▪ Role of Dietitians in Hospitals and Community Education, Incidence, Etiology, Manifestations and Dietary Management of Disorders of Gastro Intestinal tract, Liver, Gall bladder, Kidney, Cardiovascular system ▪ Diet in Metabolic Disorders and other related topics

#### **BAKERY & CONFECTIONARY**

Bakery and Storage of Bakery Ingredients ▪ Packaging and Sale of Baked Products ▪ Bakery Sanitation and Personal Hygiene ▪ Prospects and Problems in Bakery ▪ Quality Characteristics of Confectionary Ingredients ▪ Technology for manufacture of flour, fruit, milk, sugar, chocolate and special confectionary products, color, flavor and texture of confectionary ▪ Standards and Regulations, Machineries used in Confectionary Industry ▪ Raw Materials and Quality Parameters ▪ Dough Development, Methods of Dough Mixing, Dough Chemistry, Rheological Testing of Dough and various other related topics

### **SECOND YEAR -SEMESTER-IV**

#### **THERAPEUTIC NUTRITION-II**

Planning and Preparation of Routine Hospital Diets, Fluid Diets and Normal Diets ▪ Planning, Calculation and Preparation of Patients Diets having Different Disorders (Gastrointestinal, Liver, Kidney, and Cardiovascular) and other related topics

#### **FOOD BIOTECHNOLOGY & NUTRIGENOMICS**

Chemical Nature of the Genetic Material, Properties and Functions of the Genetic

Material, organization of the Genetic Material in Bacteria, Eukaryotes and Viruses ▪ Transcription and Translation: RNA Synthesis, Types of RNA, Genetic Code, Mutation and DNA Repair, Mechanisms ▪ Recombinant DNA Technology: Gene Cloning: Production of Identical Cells, Isolation and Purification of insert DNA ▪ Biosensors: Classification and Application in Food Industry ▪ Application of Biotechnology in Food, Ethical issues concerning GM foods: Testing for GMOs current guidelines for production, release and movement of GMOs, Labeling and Traceability, Trade Related Aspects, Bio- Safety, Risk Assessment, Risk Management, Public Perception of GM foods, IPR, GMO Act 2004

### **NUTRITION IN EMERGENCIES, DISASTERS AND FOR HEALTH FITNESS**

Assessment and surveillance of nutritional status in emergency affected populations, indications of malnutrition, clinical signs for screening acute malnutrition, indicators and cut-offs indicating seriously abnormal nutrition situations, weight for height based indices, social indicators, Nutritional relief and rehabilitation, assessment of food needs in emergency situations, food distribution strategy- identification and reaching the vulnerable group targeting food aid, Public nutrition approach to tackle nutritional problems in emergencies and other assignments related to the concerned topic.

### **INSTITUTIONAL FOOD SERVICE ADMINISTRATION & ENTREPRENEURSHIP IN FOOD**

**SCIENCE** Introduction of Food Service Systems and their Development ▪ Management - Definition, Principles, Functions of Catering, Management, Tools, Styles, and Theories of Management ▪ Organization Charts and its types ▪ Factors influencing meal planning, nutritional adequacy, economic considerations ▪ Unit Quality Assurance, food quality, food laws & standards ▪ Food habits, Effect of quantity cooking and processing on nutrients ▪ Benefits of cooking food ▪ Considerations of special nutrient requirements for infants, children, old age persons, pregnant women and lactating mothers, diabetic and hypertensive personnel ▪ Food decoration and servings and various other topics related to institutional food administration & entrepreneurship in food science

### **DISSERTATION THESIS / PROJECT WORK**

Work on short term research project related to Food and Nutrition in the Department / Industry (8 to 10 weeks) to get familiar with the instruments and tools used in food Industries

**ELECTIVE COURSES** (only two subjects can be selected per semester)

### **FIRST YEAR : SEMESTER - I**

#### **ELECTIVE PAPER-1: HUMAN DEVELOPMENT**

Principles of Growth and Development ▪ Care During Pregnancy and Pre-Natal and Neonatal Development ▪ Theories of Human Development and Behavior ▪ Early Childhood Care and Education, Activities to promote Holistic Development ▪ Influence of Family, Peers, School, Community & Culture on Personality Development ▪ Children & Persons with Special Needs, Care and Support, Special Education, Prevention of Disabilities, Rehabilitation ▪ Children at risk- Child Labor, Street Children, Children of

Destitute, Orphans, Child Abuse, Trafficking

## **ELECTIVE PAPER- 2: COMMUNICATION FOR DEVELOPMENT**

Basics of Communication ▪ Types of Communication ▪ Communication Systems & Communication Theories ▪ Concept of Development- Theories, Models, Measurement & Indicators of Development ▪ Concept of Development: Communication Models and Approaches, Diffusion and Innovation, Mass Media, Social Marketing ▪ Role of Communication in Development ▪ Concerns of Development Communication- Gender, Health, Environment, Sustainability, Human Rights, Population, Literacy, Rural and Tribal Development ▪ Advocacy & Behavior Change Communication: Concept, Theories, Models, Approaches, Application and Challenges, Organization /Agencies /Institutes working for Development Communication - International / National / State or Local ▪ Research Methods- Analysis of Data through Parametric and Non-Parametric Tests

## **ELECTIVE PAPER-3: APPAREL DESIGNING**

Body Measurements: Procedure, Need, Figure Types and Anthropometry ▪ Types of Machines used and their parts ▪ Elements & Principles of Design and its Application to Apparel ▪ Illustrations & Parts of Garments ▪ Fashion Terminologies, Fashion Cycle, Fashion Theories, Fashion Adoption, Fashion Forecasting and Factors Affecting Fashion ▪ Apparel Quality Testing-Quality Standards & Specification, Quality Parameters and Defects of Fabrics & Garments ▪ Care & Maintenance of Clothing - Principles of Washing, Laundry Agents, Storage Techniques Case Labels and Symbols ▪ Selection of Clothing for different age groups

## **ELECTIVE PAPER-4: INTERIOR DESIGN**

Design Fundamental: Elements of Arts, Principles of Design, Principles of Composition ▪ Color, Space, Principles of Planning Spaces ▪ Housing & Environment ▪ Energy as a Resource ▪ Product Design: Ergonomics - Significance, Scope, Anthropometry, Man, Machine, Environment Relationship ▪ Furniture & Furnishing - Historical Perspectives, Architectural Styles, Contemporary Trends, Wall Finishes, Window and Window Treatments ▪ Research Methods - Selection & Preparation of Tools for Data Collection Questionnaire, Interview, Observation, Measuring Scales, Ranking & Measurement, Reliability & Validity Of Tools

## **ELECTIVE PAPER-5: TEXTILES**

Textile Terminologies: Fiber, Yarn, Weave, Fabric etc. ▪ Classification of Fibers, Yarns & Weaves ▪ Different Methods of Fabric Construction - Woven, Knitted & Non-Woven Fabrics ▪ Textile Finishes: Dyeing & Printing, Tie & Dye, Batik, Roller Printing, Screen Printing, Discharge, Heat Transfer Printing & Digitized Printing ▪ Traditional Textiles of India ▪ Identification on the basis of Fiber Content, Techniques, Motif, Color and Design ▪ Textile Testing & Quality Control ▪ Textile & Environment: Banned Dyes, Eco-Friendly Textiles, Contamination & Effluent Treatment, Eco-Label & Eco Marks

## **FIRST YEAR : SEMESTER - II**

### **ELECTIVE PAPER-6: RESOURCE MANAGEMENT & CONSUMER ISSUES**

Management ▪ Functions of Management ▪ Resources ▪ Management of Natural Resource ▪ Money Management ▪ Human Resource Management ▪ Consumer Protection ▪ Entrepreneurship ▪ Research Methods: Sampling Techniques, Types of Sampling, Sampling Procedures, Probability & Non- Probability Sampling

### **ELECTIVE PAPER-7: EXTENSION MANAGEMENT & COMMUNITY DEVELOPMENT**

Historical Perspectives of Extension ▪ Program Management: Extension Methods & Material - Concept, Theories, Approaches, Scope, Methods & Material used ▪ Challenges of Implementation & Evaluation ▪ Issues to be addressed ▪ Training ▪ Community Development: Perspective, Approaches, Community Organization, Leadership, Support Structures for Community Development ▪ Panchayati Raj Institutions, NGOs & Community Based Organizations ▪ People's Participation & Stakeholders' Perspectives ▪ Development Programs in India ▪ Research Methods: Scientific Report Writing, Presentation of Data, Interpretation & Discussion

### **ELECTIVE PAPER-8: BIO-TECHNIQUES & RESEARCH METHODOLOGIES- I**

Principles & Applications in Food Science and Nutrition: Selection of Valid Method, Bioassay, Reliability of Data, Units, Conversions & Abbreviations ▪ Microscopy, Histology & Centrifugation Colorimetry, Spectrophotometry, Mass Spectrometry, Electron Spin Resonance & Nuclear Magnetic Resonance Spectroscopy ▪ X-ray Diffraction ▪ Chromatography, Electrophoresis, Polymerase Chain Reactions, Immunodiagnostic & Radioisotope ▪ Electrochemical Techniques and Biosensors Monitoring of Ambient Air Pollution, Water Pollution, Soil and Noise Pollution ▪ Management of Laboratory Animals ▪ Preparation of their Diets ▪ Hazardous Laboratory Materials & Chemicals Management of laboratory animals ▪ Dissecting the Animal and Fixation of Tissues & Histological Examination

### **ELECTIVE PAPER -9: NON-FORMAL ADULT AND LIFE LONG EDUCATION**

Non Formal Education ▪ Difference between Formal & Non-Formal Education ▪ Organizing NFE Programs: Target Group; Physical Aspects ▪ Adult Education: Meaning, Concept & Scope ▪ Adult Education Programs in India ▪ Life Long Education: Meaning & Concept of Life Long Education ▪ Historical & Contemporary Perspectives ▪ Significance of Life Long Education in Contemporary Society ▪ Principles of Life Long Education ▪ Scope of Communication Methods

### **ELECTIVE PAPER-10: THEORIES OF HUMAN DEVELOPMENT**

Introduction to Theories in Human Development: Key Themes in the Study of Human Development - Nature /Nurture, Active/ Passive, Continuity/Discontinuity, Individual Differences & Similarities ▪ Role of Theories in understanding Human Development ▪ Perspectives on Human Development: Evolutionary & Ethological/ Biological: Darwin, Lorenz, Bowl by, Ecological: Bronfenbrenner, Behavioral: Pavlov, Skinner, Bandura ▪ Selected Theories of Human Development: Psychodynamic; Psychosexual & Psychosocial Theories; Freud, Erikson, Cognition: Piaget, Vygotsky, Models & Theories of

Intelligence: Guilford, Spearman and Gardener, Humanistic: Maslow and Rogers ▪

Theories in everyday life: Eclectic theoretical orientation, Ethno theories

## **SECOND YEAR : SEMESTER - III**

### **ELECTIVE PAPER-11: CHILDHOOD DISABILITY AND SOCIAL ACTION**

Understanding Disability & Inclusion: Types of Disability: Disability & Society: Overview of Practices and Provisioning related to Addressing Disability in India, Prevention, therapy, education and management ▪ Families of Children with Disabilities ▪ Policy and Laws

### **ELECTIVE PAPER-12: CHILD RIGHTS AND GENDER JUSTICE**

Introduction to Child Rights: Concept of Child rights, Children in need of Care & Protection ▪ Vulnerable Groups: Causes & Consequences ▪ Socialization for Gender: Gender Roles, Stereotypes & Identity ▪ Gender in the Workplace & Public Spaces ▪ Contemporary Influences: Media and Popular Culture, Demographic Profile of Women & Children in India ▪ Gender & Indian Society Biological and cultural determinants

### **ELECTIVE PAPER-13: FAMILY STUDIES**

Guidance & Counseling - across life span and for care givers ▪ Health & Well Being across Life Span Development ▪ Concept of Home Management, System Approach to Family, Input, Output & Feedback ▪ Family Resources-Management of Resources like Time, Energy & Money ▪ Basic Characteristics of Resources ▪ Efficient Methods of Utilization of Resources ▪ Concept of Communication Process & its Importance in Family ▪ Concept of Work Simplification - its importance in home

### **ELECTIVE PAPER - 14: BIO-STATISTICS AND COMPUTER APPLICATIONS**

Definition & Identification of Research Problem, Justification, Hypothesis, Assumptions, Limitations of a Problem ▪ Research Design: Principles, Purpose Application, Exploratory & Descriptive, Survey and Case Study ▪ Conceptual Understanding of Statistical Measures, Sampling

Introduction to Computers & its Classification: Hardware, Software & Input Devices: Keyboard, Mouse, Bar Code Readers, Optical Card Readers, Magnetic Ink Corrector Reader, Smart Cards ▪ Output Devices: Monitor, Printer. Primary & Secondary Storage Devices ▪ Data Processing Concepts ▪ Introduction to Storage Devices, Characteristics, Secondary Storage, Data Information & Data Processing

### **ELECTIVE PAPER -15: BIOTECHNIQUES & RESEARCH METHODOLOGIES**

Principles & Applications in Food Science and Nutrition: Selection of Valid Method, Bioassay, Reliability of Data, Units, Conversions & Abbreviations, Metric & English units ▪ Colorimeter, Spectrophotometry, Mass Spectrometry, Electron Spin Resonance & Nuclear Magnetic Resonance Spectroscopy, X-ray diffraction ▪ Electrophoresis, Polymerase Chain Reactions ▪ Electrochemical Techniques ▪ Chromatography & Biosensors, Monitoring of Ambient Air Pollution, Water Pollution, Soil & Noise Pollution ▪ Management of Laboratory Animals ▪ Preparation of their diets ▪ Food Processing &

Preparations, Food Packaging techniques & instruments involved in food packaging and other topics related to bio techniques and research methodologies