

Department of Home Science

University of Calcutta

Admission Notice for Ph.D. Programme in Home Science 2022

Applications are invited for:-

- i) 08 vacancies in Home Science (Food and Nutrition) stream
- ii) 09 vacancies in Home Science (Human Development) stream

under Department of Home Science, University of Calcutta

Eligibility Criteria:

- i) For Ph.D. in Food and Nutrition - M.Sc. in Food and Nutrition or equivalent degree from a recognized university with minimum 55% marks in M.Sc. for General candidates and minimum 50% marks in M.Sc. for SC/ST/OBC/Physically Handicapped candidates.
- ii) For Ph.D. in Human Development - M.A. /M.Sc. in Human Development or equivalent degree from a recognized university with minimum 55% marks in M.A. /M.Sc. for General candidates and minimum 50% marks in M.A. / M.Sc. for SC/ST/OBC/Physically Handicapped candidates.
- iii) Reservation in admission shall strictly abide by the West Bengal State Higher Educational Institutions (Reservation in Admission) Rules, 2013.

Admission test for Ph.D. programme in Home Science will be of 50 marks. The medium of writing answers for the admission test is English.

For Food and Nutrition

Type of questions	Marks per question	No. of questions	Total marks
MCQ	1	50	50

For Human Development

Type of questions	Marks per question	No. of questions	Total marks for each type of question
MCQ	1	30	30
Essay type	10	2	20
		Total	50

Candidates are requested to download the application form from the university website (<https://www.caluniv.ac.in/>) and to submit the filled-in form with photocopies of all relevant testimonials within **17th June 2022 (Friday)** at the Department of Home Science, University of Calcutta, Viharilal College Campus, 20 B Judges' Court Road, Alipore, Kolkata 700027.

Date of publication of lists of candidates eligible for admission test: **22th June 2022 (Wednesday)**. The list will be displayed on the departmental notice-board.

Date of admission test: **Friday, the 24th June 2022 (Friday) (12 Noon-1P.M.)**. The test will be held at the Department of Home Science, University of Calcutta.

Date of publication of lists of candidates eligible for interview: **30th June 2022 (Thursday)**. The list will be displayed on the departmental notice-board.

Date of interview: **08th July 2022 (Friday)**. Interview will be held at the Department of Home Science, University of Calcutta.

Final list of selected candidates will be displayed on the departmental notice-board.

SYLLABUS FOR RET 2022(Home Science - Human Development)

Conception to Middle Childhood: Issues and Challenges

1. Prenatal development: Significance of prenatal development, Hazards during different stages of prenatal period, Role of teratogens, foetal abnormalities. Overview of the birth process, types of birth and complications during delivery.
2. Infancy: a) Neonate: Measures of neonatal health and responsiveness, Premature and low birth weight babies, physical and physiological state of neonates, reflexes and sensory capacities.
b) Toddler hood: Sensitive periods; significance of stimulation and parental involvement; social relationships.
3. Early childhood: Motor skills, Perceptual skills, Memory and mental representation, Language acquisition, the emerging self.
4. Middle childhood: Sensitive periods; the experience of schooling – academic achievement, Gender roles, Social relationships - peers, siblings and parents, Cultural influences.

Adolescence and Youth: Challenges and Guidance

1. Adolescence and Youth – Definition, Concept of adolescence and youth in India.
2. Theoretical perspectives – G. Stanley Hall, Erik Erikson, James Marcia; Indian Perspectives
3. Perspective of Adolescent and Youth Development –Identity formation; Changes in attitude, interest and behaviour; Factors influencing the developments and its consequences.
4. Relationships during Adolescence and Youth - Parent-adolescent/youth relationship, Sibling relationship; Peer relationship, Heterosexual relationship.
5. Adolescent health, Sexuality, Mental Health and Risk behaviours.

Theories of Human Development

1. Theories of early social development: Bowlby's theory of attachment; Harlow's ethological researches.
2. Psychoanalytic theories of Freud and Erikson- Implications for child rearing practices.

3. Cognitive developmental theories: Piaget's theory of cognitive development, Neo- Piagetian studies; Vygotsky's socio cultural theory.
4. Theories of learning: Pavlov's theory of classical conditioning; Skinner's theory of operant conditioning; Bandura's social learning theory.
5. Kohlberg's theory of moral development.

Adulthood and Aging: Challenges and Care

1. Introduction to Adulthood and Development – Stages of adulthood; Life span approach; Family and Career perspective; Gender differences in work and career development.
2. Early Adulthood- Importance of social organization- Single life, Marriage and Marital adjustments; Parenthood and Non-parenthood, Divorce and remarriage.
3. Middle Adulthood –Development of Self; Roles in family and Maintaining Family relationship, Friendships; Inter-generation relationships-Parenting adult offspring and their marriage, Health and Disease, Menopause in Women, Adult sexuality; Work and Career development.
4. Late adulthood and Old age –Physical aspects of aging; Health and disease; Continuity and change in personality; changes in family life cycle and social relationships; Work and Retirement; Alternative life styles and Leisure time activities; Death, dying and bereavement.

Research Methodology

1. Research: Definition; scope in Human Development; types of research – Survey, Experimental and Case Study.
2. Selection of a research problem; formulation of hypothesis and basic assumptions.
3. Research design: Definition, principles, purposes & models.
4. Sampling: Definitions of population and sample; types and selection of samples, evaluating a sample.
5. Tools and techniques of data collection; Analysis and interpretation of data; guidelines for presentation of data- tables, graphs and illustrations.
6. Report writing.

Application of Statistics in Human Development

1. Levels of measurement, discrete and continuous variables, the concept of probability; normal distribution; normal distribution curve; skewness and kurtosis; use of normal distribution tables.
2. Elements of testing of statistical hypothesis: Independent, dependent and control variables, Null and alternative hypotheses; Type I and Type II errors; levels of significance; critical values; Non-parametric tests- Chi-square; Large sample tests for difference in means – the z test.
3. Application of Student's t test for difference in means of small samples.
4. Correlation: Influencing factors; types; computation of Product – Moment Correlation Coefficient; significance of correlation coefficient.
5. Regression and prediction.
6. Analysis of Variance: One – way, Two-way.

Children with Special Needs

1. Children with Special Needs – Need for recognizing individual difference; Various approaches to defining and understanding disability – Philanthropic, Medical, Administrative, Legal and Social approach; Types of disability and Rights of disabled children.
2. The role of context in the meaning of normality and disability; attitudes of people towards disability.
3. The philosophy of inclusion; modification of physical and social environment enabling participation of children with special needs as contributing members of the society; use of assistive devices.
4. Children with Communication Disorders: Definition, Classification, Characteristics, Causes, Techniques of identification and assessment, Remedial and Special educational programme.
5. Persons with multiple disabilities: Autism Spectrum Disorders; Hydrocephalus; Cerebral Palsy; Multiple Sclerosis; Epilepsy –symptoms, causes, identification, assessment, management and rehabilitation.
6. Children with Emotional and Behavioural disorders: Types, Symptoms and Causes, Education and Management.

Early Childhood Care & Education

1. Early Childhood Education - Definition, Need and importance, aims and objectives, Outcome of early childhood education on all round development
2. Contributions of Educators and its implications for programme planning; ECCE curriculum and Intervention models and innovative programme and approaches across countries
3. Programme content, learning environment, Role of teacher, Role of learner and parents; Contemporary theories, practices and policies in ECCE
4. Role of Parents and community in ECD Programme – Developing sensitivity to cultures and traditions of community, methods and strategies for parents and community; Reasons for involvement and need assessment; effective use of involvement to monitor and enhance programme quality;
5. Understanding importance and value of play, theories of play and its implications for planning ECCE programmes
6. Issues and concerns related to ECCE/ECD programme – Coverage of populations, reaching the unreached; gender equality and equity; Quality and sustainability; Training of personnel; Accreditation

Extension Education : Techniques and Programmes

1. Extension education: Meaning; scope; principles; objectives. Elements involved in the extension education process. Concept and importance of Community; Classification of Communities; Difference between community and society.
2. Understanding adult learners: Characteristics and problems of adult learners; motivation techniques to urge adults to learn and adopt innovations.
3. Classification of extension teaching methods according to form and use.
4. Techniques of programme planning: Importance of programme planning, implementation and evaluation; principles of programme planning; criteria for evaluation, tools and techniques for evaluation.
5. Home science extension: Need for home science extension; origin and development of home science extension; role of home science extension workers.

Family Welfare & Women's Studies

Objectives and needs of welfare services, classification of services. Types of programmes for women, child and family welfare. Status of women and children in India.

1. Women's Studies: Meaning, basic concepts and significance. Growth of Women's Studies in India and in other countries, Millennium Development Goals, Women's movement in India
2. Theoretical approaches to feminism: Liberal; Radical; Post- Modernist; Psychoanalytical.
3. Problems and issues related to women in India: Female foeticide; female infanticide; gender discrimination in nutrition, healthcare and education; female mortality; child marriage; trafficking of women; domestic violence; harassment of women at work ; provisions for women in the Indian constitution.
4. Important legislation for women's welfare: Maternity benefit scheme, pension schemes for widows. Rights of women.

Revised RET Syllabus Home Science Food and Nutrition

❖ Topic- I

Nutrition

1. Bio-Chemical and Physiological Role, bio-availability, requirements, sources, deficiency & excess of different nutrients.
2. Basic concepts of food commodities--Structure, nutritive value, processing, storage, use in various preparation, variety,selection .
3. Meaning of probiotics, prebiotics, nutraceuticals, organic food, GM food.
a) Impact of good nutrition on the outcome Management of preterm and low birth weight babies. of pregnancy.Diet during pregnancy and lactation.Breast feeding vs. artificial feeding. .Nutritional problems of preschoolers.
4. Energy computation in Human Nutrition. Growth & Development from infancy to adulthood. Growth monitoring and promotion. Use of growth charts and standards, Prevention of growth faltering.
5. Meal pattern and nutritional requirements of different age groups in the life cycle.
6. Meaning, purpose and principle of therapeutic diet. Basic concept and methods of a) oral feeding, b) tube feeding ,c)intravenous feeding and d) enteral nutrition.
7. Etiology, pathology, metabolic changes, clinical manifestations and dietary management of the following diseases:
a) gastritis, b) constipation, c) diarrhoea, d)liver and gall bladderdisorders, e) renal disorders, f) cardiovascular disorder, g) metabolic disorders-obesity, gout,

- diabetes mellitus, and inborn error of metabolism, h) allergy i) cancer j) surgical conditions and burn.
8. Nutrition, immunity and infection – mechanism of interaction, agent, host environment in disease occurrence, meaning of epidemiology.
 9. Meaning of community and Community Nutrition. Malnutrition: Meaning, Types of Malnutrition, Ecology of malnutrition-environmental, social, and economical factors. Classification of PEM-causes, signs and symptom, Treatment and Preventive measures.
Nutrition education –Meaning, objectives, process of nutrition education communication, suitable aids. Nutrition Surveillance and monitoring: definition, milestone in the development of nutrition surveillance. AAP approach, monthly monitoring and nutrition surveillance Concept, definitions of food and nutrition security at national, household and individual level.
 10. Basic Concept of Bioenergetics, energy sources during exercise (Phosphagen, Anaerobic system and aerobic system). Benefits of an active lifestyle, Fitness and its measurement. Health-related and sport-related components of physical fitness. Energy system in exercise, factors affecting fuel utilization. Dietary and nutritional recommendations for athletes.

Topic -II

Biochemistry

1. Nomenclature and classification of enzymes, coenzyme and their function, factors influencing enzyme reaction kinetic properties, Michaelis constant inhibition, purification, methods for determining activities of some important enzymes, isoenzyme, mechanism of enzyme action, regulation of enzyme activity, allostericity and feedback inhibition
2. Aerobic and anaerobic degradation of carbohydrates, glycogenesis, glycogenolysis, gluconeogenesis, HMP shunt pathway; Regulations of blood glucose level; Biological oxidation and electron transport chain
3. Methods of amino acid breakdown and protein metabolism. Urea formation and uric acid biosynthesis-clinical significance
4. Biosynthesis of fatty acid, regulation and mechanism of chain elongation; biosynthesis of eicosanoids – prostaglandins, and their physiological importance; metabolism of cholesterol and its regulation.
5. Nucleic acids: Structure, replication, transcription, genetic code, elementary knowledge of biosynthesis of proteins.
6. Brief Introduction of biological membranes to understand molecular transport, Transport of Large molecules, Receptor mediated endocytosis, exocytosis, Molecular aspects of transport; Passive diffusion, facilitated diffusion, active transport.
7. Biochemical role of fat soluble vitamins and Water soluble vitamins. Biochemical role of inorganic elements (Macro and Micro minerals)

Topic -III

Microbiology

1. Microorganisms important in food microbiology- moulds, yeast, bacteria; Growth of Bacteria, isolation of pure culture and staining techniques
2. Physical and chemical means used in destruction of microbes: role of heat, filtration and radiation in sterilization, use of chemical agents-alcohol, halogens and detergents
3. Importance of microbes in food: genetically engineered organisms, probiotics and single cell proteins; Dairy products and traditional Indian fermented foods and their health benefits.
4. Microbiology of water- Number and kinds of microorganisms present in water sample. Detection, classification and confirmation of coliform bacteria, Faecal and non-faecal coliform bacteria, Purification of water. Diarrhoea causing microorganisms, toxins
5. Microorganisms involved in spoilages of various foods: Milk, cereals, vegetables, fruits, fish, meat, egg and canned food. Fundamentals of control of microorganism in foods: Extrinsic and intrinsic parameters affecting growth and survival of microbes, use of high and low temperature, dehydration, freezing, freeze-drying, irradiation and preservatives in food preservation.
6. Public health hazards due to microbial contamination of foods: Important food borne infections and intoxications due to bacteria and moulds; Symptoms, mode of transmission and methods of prevention. Food adulteration and Natural toxicant in food, Heavy metal toxicity
7. Assessing the microbiological quality of food: indicator organisms, microbiological standards, principles of GMP & HACCP in food processing. Safety management at household and industrial level.

Topic-IV

Physiology

1. **Alimentation:** Mechanism of HCl secretion— physiological, nutritional and pharmacological aspects. Absorption of fat, minerals, vitamins. Bile formation and secretion; Nature of exo- and endopeptidases and their mechanism of action in protein digestion; Role of mucosal associated lymphocytes in health and disease; Neuroendocrine control of hunger and satiety. Physiology of obesity and starvation. The genomics of leptin mediated responses-obesity and its regulation.
2. **Immunology:** Cells and organs of Immune system. Innate immunity and Acquired immunity, Antigen, hapten and allergen. Immunoglobulins- different isotypes. Antigen-Antibody interactions. T cell cytotoxicity. Cell-mediated effectors function, Cytokines, Hypersensitivity reactions. Autoimmunity- autoimmune diseases, Immunodeficiency.
3. **Endocrinology:** Mechanism of action—Steroid and Protein hormones, Gastro-intestinal hormones: Site of origin, chemical nature and mode of action.

4. **Cell Biology** : Ultramicroscopic structure of organelles of animal cell. Plasma membrane-transport through cell membrane- Transport of nutrients, study of active and passive transport mechanisms, the glucose transporter as unique family of proteins. Golgi bodies, Endoplasmic reticulum, mitochondria, lysosomes- E/M structure related to functions. Cell junctions, cytoskeleton, Cell Cycle, factors controlling cell cycle; Cell to cell signaling: hormones and receptors, second messenger. Cell signaling pathway
5. **Genetics** □ Molecular anatomy of genes- Nucleic acids- structure and organization □ DNA replication, transcription, translation, Post-translational modification. Genetic code, Mutationstypes. Physiological and genetic changes in aging.
6. **Inborn Error of Metabolism** □ Hereditary lactose malabsorption, Galactosemia □ Disorder of amino acid metabolism --- Albinism, Alkaptonuria, Phenylketonuria, Maple syrup urine disease, Tyrosinemia, Cystinuria, Homocystinuria, Hartnup disease □ Hereditary fructose intolerance, Essential fructosuria □ Willson's disease