JAMMU AND KASHMIR PUBLIC SERVICE COMMISSION

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Subject: Filling up of the posts of Assistant Professor in Higher Education Department in Higher Education Department.

Notice

Dated: 18 -12-2025

It is for information of all the applicants who had applied for the posts of Assistant Professor Food Science, Food Science & Quality Control and Assistant Professor Food Technology & Food Processing advertised vide Notification No. 06-PSC (DR-P) of 2023 dated 01.03.2023 and No. 17-PSC (DR-P) of 2023 dated 15.05.2023 respectively, that the prescribed syllabus for the said posts is as under:-

1.Posts notified vide Notification No. 06-PSC(DR-P) of 2023 dated 01.03.2023

Appended as Annexure "A"

2.Posts notified vide Notification No. 17-PSC(DR-P) of 2023 dated 15.05.2023

Appended as Annexure "B"

18.12.2025
(P.N Hamid) JKAS,
Deputy Secretary
J&K Public Service Commission.

PSC/DR/APs/Hr. Edu/2023 Dated. 18.12.2025

Copy to the:-

1. Financial Commission, (Additional Chief Secretary), Higher Education Department, Civil Secretariat, J&K.
2. Director, Information and Public Relations, Government of Union Territory of J&K for Publication of the Notice in two National News papers and all local dailies of the UT of J&K..
3. P.S to Chairman, J&K Public Service Commission for information of the Hon'ble Chairman.
4. In-Charge website for uploading the notice on website (ww.jkpsc.nic.in).
5. Main file/Stock file/Notice Board.

Annexure "A"

ASSISTANT PROFESSOR FOOD SCIENCE, FOOD SCIENCE AND QUALITY CONTROL.

NOTIFIED VIDE NOTIFICATION NO. 06-PSC(DR-P) OF 2023 DATED 01.03.2023

I. Food Chemistry

Water activity and its relation to spoilage of foods. Water-solute interactions. Moisture sorption isotherms & hysteresis. Carbohydrates-Structure and functional properties of mono, oligo & poly- saccharides including starch, cellulose, pectic substances. Non-Enzymatic browning reactions in foods. Polysaccharide solubility, viscosity and stability. Starch structure, Gelatinization and pasting properties. Hydrolysis of starch. Guar gum, locust bean gum, Xanthan gum, Carrageenans, beta- glucan. Amino acid structure, acid- base properties and hydrophobicity. Proteins: structure and forces involved in stability of protein structure. Protein denaturation, thermodynamics of denaturation and denaturing agents. Functional properties including hydration, solubility and interfacial properties. Nutritional properties of proteins: protein quality, digestibility, evaluation of protein nutritive value. Lipids. Nomenclature of saturated and unsaturated fatty acids. Physical properties of triacylglycerols - rheological, density, thermal and optical properties. Crystallisation and melting of food lipids. Physicochemical transition of lipids – supercooling, nucleation, crystal growth, post crystallization events. Polymorphism in lipids. Isolation, purification and modification of lipids. Mechanism of oxidative rancidity and role of Prooxidants and antioxidants in lipid oxidation. Food lipids and health. Trans- fatty acids, omega fatty acids

II. Food Microbiology

Characteristics of microorganisms: morphology of bacteria, yeast, and mold. Microbial growth: growth and death kinetics, factors affecting microbial growth- pH, moisture content, redox potential nutrient content and extrinsic factors. Food spoilage: spoilage microorganisms in different food products including milk, fish, meat, egg, cereals and fruit and vegetables. Food borne disease – Staphylococcal gastroenteritis, Botulism, Listeriosis, Salmonellasis, Shigillosis. Toxicants of microbial origins – Aflatoxins, ochratoxins, patulin, botulinum, enterotoxins. Types of fermentation: Solid substrate and submerged fermentation, continuous and batch fermentation, fermented foods: curd, yoghurt, cheese, pickles, sauerkraut, Idli, dosa, and vinegar Antimicrobials- benzoic acid, sulfur dioxide, propionic acid, sorbic acid, and nisin. Single cell protein-Sources, substrate requirement and Production. Enzyme immobilization: Methods and advantages.

III: Food processing and engineering

Thermal processing- Pasteurization, sterilization, Canning, and aspectic processing Thermal process calculations- D value, Z value, F value. Calculation of process time for canned foods. Fluid flow – Viscosity and its measurement: Newtonian and non-newtonian fluids. Heat transfer - Modes of heat transfer, conduction, convection and radiation. Heat exchangers- scraped surface, double pipe, shell and tube and plate heat exchangers Size reduction - Elastic stress limit, yield point Kicks law, Rittengers law, Bonds law. Equipment for fibrous foods - slicing, dicing, flaking, shredding, pulping and chopping. Equipment of dry foods – ball mills, disc mills, hammer mills, roller mills. Size reduction of liquid foods-

homogenization,ultra-sonication and wet milling. Dehydration– dehydration curve, types of dryers, effect of dehydration on food quality. Intermediate moisture foods. Refrigeration, freezing and freeze drying - Components of refrigerator, freezing curves and process and construction of freeze dryer . Types of freezers- chest freezers, blast freezers, belt freezers, fluidized bed freezers, immersion freezers. Types of evaporators- Single effect evaporators, multiple effect evaporators. High pressure processing of foods- quality changes, effect of pressure on microorganisms and its application in food processing. Pulsed electric field- principle, mechanism of microbial inactivation, application of pulsed electric field. Ultrasonic in food processing- properties and generation, cavitation and application of ultrasound in food processing. Ohmic heating and microwave heating. Natural and processing induced toxins and their biotransformation in foods.

IV: Food Analysis & Quality control

Tristimulus color system & hunter lab. Atomic absorption spectroscopy and ICP. Mass spectroscopy– Instrumentation and interpretation. X- ray analysis of foods: properties, production and detection. Applications in food industry. Mass spectrometry: Instrumentation and interpretation. Chromatography– Principles of different chromatographic separations- HPLC & Gas Chromatography. Nuclear magnetic resonance (NMR): principle, components, interpretation. ELISA & PCR. Rheology measurement– Farinograph, Amylograph, Rheometer. Objectives, importance and functions of quality control. Methods of quality assessment-Subjective & objective methods. Sensory evaluation methods / training– Difference tests (Paired comparison, Duo Trio, Triangle), Rating ranking, single sample, two sample, multiple sample, hedonic), sensitivity threshold test. National & international Food laws Food Safety and Standards Act 2006, Codex Alimentarius Commission. General hygiene and sanitation in food industry– GMP, HACCP. Food adulteration and food safety– Physical, chemical & biological hazards in foods. Methods of evaluation of different food adulterants. Quality evaluation of foods- fruits, vegetables, cereals, milk, egg and meat.

V: Cereal, legume and oil seed technology

Structure and chemical composition of different grains like wheat, rice, maize, barley, oats and millets. Wheat milling – principle, conditioning and milling systems. Structure and functionality of wheat proteins. Vital wheat gluten – manufacturing techniques, uses and functionality. Bread making processes, development in bread making methods, functions of ingredients/ additives such as fat, emulsifiers, oxidants, reducing agents, conditioners. Technology of biscuit, cake, cookies and cracker manufacture. Milling of rice – types of rice mill, By-products of rice milling and their utilization. Parboiling of rice. Wet and dry milling of corn. Corn products and their uses. Oil extraction from different seeds and its refining. Structure and composition of pulses, their importance in Indian diet. Dhal milling and processing of pulses. Composition, nutritional significance and processing of some millets like sorghum, pearl millet, foxtail millet and proso millet.

VI: Fruit and vegetable Technology:

Fruit maturity and ripening indices. Ethylene biosynthesis, mode of action, inhibition of ethylene synthesis. Controlled atmospheric storage – Principle, design considerations,

effects of CA storage on food quality. Modified atmospheric storage. Hypobaric storage. Zero energy cool chamber: Its construction and advantages. Chemistry of pectin, theories of gel formation. Role of enzymes in processing. Fruit & vegetable Juices: Preparation & preservation of juices syrups, cordials. Squash, concentrate pickles, tomato products. Jams, Jellies, Marmalades and preserves. Canning: spoilage of canned products. Properties of plant pigments (chlorophyll, anthocyanins and carotenoids). Effect of processing on these pigments. Processing of tea, coffee and cocoa. Waste utilization for sustainability and circular economy. Minimally processed fruit and vegetables.

VII: Technology of milk and milk products

Sources and composition of milk, nutritive value. Storage, transportation and distribution of milk. Processing of market milk- standardization, toning of milk, homogenization, Pasteurization, sterilization and UHT. Milk products - Processing of ice cream, cream, butter oil, condensed milk, evaporated milk, whole and skimmed milk. Cheese – cheese making process, types of cheese, ripening of cheese and defects of cheese. Processing Technology of traditional milk products of Jammu and Kashmir: Kalari/ Kaladi, Churpi and Kudaan.

VIII: Technology of meat, fish and poultry products

Sources of meat, composition and nutritive value of meat. Structure of muscle. Factors affecting meat production and quality. Slaughtering of animals and poultry. Post mortem changes in meat. Meat tenderization and aging. Preservation of meat by freezing, curing, and smoking. Myoglobin- structure and properties. Structure, composition, nutritive value and functional properties of eggs. Factor affecting egg quality and measures of egg quality. Preservation of eggs by different methods. Fish - composition & structure. Post mortem changes in fish. Preservation of fish by freezing, glazing of fish, canning, smoking, freezing, irradiation and dehydration Technology of production of fish sausage, fish meal and fish oil.

IX: Food packaging and additives

Definition and functions of packaging. Migration of contaminants and its testing. Metals: Tinplate containers, tinning process, Low tin steels, tin free steel (TFS). Can-manufacturing, types and lacquering. Plastics: chemistry and properties, polymerisation. Barrier properties of packaging materials: gas transmission rate (GTR) and water vapour transmission rate (WVTR). Polymer processing. Innovative technologies in food packaging: active packaging, intelligent packaging and anti microbial packaging: application and technologies. Biodegradable packaging, types advantages and disadvantages. Packaging requirements- Dairy, cereal, meat, spices, fruit & vegetable. Food packaging- regulations and labeling. Definition and classification of additives. Natural and synthetic colorants used in foods. Artificial flavours, flavor enhancers and sweeteners used in foods.

X: Recent developments in Food Science and Technology

Nutraceuticals and functional foods: Probiotics, prebiotics and Synbiotics, Omega-3 fatty acids metabolism, Phytochemicals and antioxidants, biosynthesis of phenolic

compounds. Dietary fibre -physical and physiological properties. Nanotechnology applications in food processing and packaging. Concept of nano sensors. Micro and nano encapsulation techniques for retention and controlled release of bioactive compounds like Microfluidization, electrospinning, Spray drying, extrusion, Coacervation, freeze drying, wet milling and emulsification. Alternate proteins for meat, dairy and egg. High moisture extrusion for alternate protein structure modification. Cultured meat - Production and processing. 3D food printing and personalized nutrition. Application of Artificial intelligence (AI) for bioactive peptide identification in food proteins.

Annexure "B"

ASSISTANT PROFESSOR FOOD TECHNOLOGY & FOOD PROCESSING. NOTIFIED VIDE NOTIFICATION NO. 17-PSC(DR-P) OF 2023 DATED 15.05.2023

Unit 1: Food Preservation and Processing

Principles and methods of food preservation, types of preservatives and their applications in food processing. Significance of D-value, Z-value and F-value in preservation of foods, Intermediate moisture foods, Processing and preservation by heat – blanching, pasteurization, sterilization and UHT processing, canning, extrusion cooking, dielectric heating, microwave heating, ohmic heating. Processing and preservation by low-temperature- refrigeration, freezing, Controlled Atmosphere, Modified Atmosphere, and dehydro-freezing. Processing and preservation by drying, and concentration. Membrane technology: micro-filtration, Ultra-Filtration, Nano-Filtration and Reverse Osmosis. Processing and preservation by non-thermal methods- irradiation, high pressure processing, pulsed electric field, pulsed X-rays, hurdle technology, thermo-sonication, ultrasound, bacteriofugation, bacteriocins in food processing.

Unit 2: Food and flavor Chemistry

Carbohydrates: classification, monosaccharides, oligosaccharides, and polysaccharides-starch, cellulose and pectic substances, molecular structure of starch, gelatinization, pasting, retrogradation and staling, resistant starch, polyols, modified starches, cyclodextrins, gums-Xanthan gum, gum Arabic, locust bean gum, carrageenan. Proteins: classification of amino acids and proteins, protein structure, denaturation and denaturing agents, functional properties of proteins, protein quality and digestibility. Lipids: saturated and unsaturated fatty acids, phospholipids, types of oxidation (autooxidation, photooxidation and enzymatic), major toxic lipid oxidation products, measurement of lipid oxidation, hygrogenation, polymorphism in lipids, fat mimetics and fat replacers. Anti-oxidants: sources, classification, mechanism of action. Water activity and its relevance to deteriorative processes in foods, sorption phenomenon, hysteresis. Non-enzymatic browning (NEB): factors affecting NEB and its control.

Flavor chemistry: Sources of flavours (natural, processed and added), flavour emulsions, lipid derived flavours, flavour of vanilla, Oleoresin and essential oil extraction, flavor reversion.

Unit 3: Food Engineering

Thermal properties of foods such as specific heat, thermal conductivity and thermal diffusivity. Mechanism of heat transfer in conduction, convection and radiation. Fourier's law, steady state and unsteady state conduction, Convective heat transfer coefficient, thermal boundary layer, Nusselt number, Prandtl number, heat transfer by forced convections, free convection, laws of radiation, heat exchangers, Newtonian and non-Newtonian fluids, Reynolds number, Size reduction, theory and laws of size reduction, size reduction equipments- ball bill, disc mill, hammer mill, Cryogenic freezing and IQF; Food freezing equipment such as air blast freezers, plate freezers, fluidized bed freezers and immersion freezers, Cryogenic freezing, drying curve, types of dryers and effect of drying on food quality.

Unit 4: Food analysis and Quality management

Texture analysis of foods, Colour measurements- CIE, Munshell and Hunter lab, Atomic absorption Spectroscopy (AAS), and Inductively Coupled Plasma (ICP) Spectroscopy, Viscosity measurements, Rheological testing of dough- Farinograph, Mixograph, Extensograph, Amylograph / Rapid Visco Analyzer, Falling number, Differential scanning colorimetry, Nuclear magnetic resonance (NMR), Chromatographic methods in food analysis- column, size exclusion, ion exchange chromatography, HPLC, Gas chromatography, LC-MS. X-ray diffraction analysis of foods. Concepts of quality management: Objectives, importance and functions of quality control; Sensory evaluation methods, discriminative and descriptive tests. Quality management systems in India; Food Safety and Standards Act, 2006, Codex Alimentarius Commission, ISO, FSMS-ISO-22000-2005, Quality assurance, Total Quality Management; GMP/GHP; Sanitary and hygienic practices; HACCP, physical, chemical and biological hazards in foods, food adulteration and methods of detection.

Unit 5: Food Microbiology

Factors affecting microbial growth in foods-intrinsic and extrinsic factors, bacterial growth curve, Microbial spoilage of foods, spoilage microorganisms of milk, fruit & vegetables, cereals, meat and poultry, enzyme immobilization, Fermentation technology-types of fermentation, technology of fermented foods including vinegar, yogurt, curd, cheese, pickles, sauerkraut, probiotics and prebiotics, single cell proteins, food borne diseases, Food intoxication and food borne illness, microbial toxins-aflatoxins, ochratoxins and patulin

Unit 6: Cereal, Pulses and Oilseed Processing

Structure and composition of cereals, pulses and oilseeds. Wheat processing-types of wheat, their suitability for processing, hydrothermal treatment/conditioning, milling, technology for manufacture of bakery products i.e., bread, biscuits, cakes and pasta, role of various ingredients, maturation, flour improvers, bleaching agents and enzymes in baking. Rice Processing-Modern Rice Milling, by-products of rice milling and their utilization, parboiling of paddy, physico-chemical changes during parboiling and its effects on rice quality, Barley: Pearling, malting, brewing, health benefits of β-glucan. Corn: wet and dry milling, manufacture of high fructose corn syrup. Millets and Pulses: nutritional significance of major millets, anti-nutritional factors in pulses, different unit operations of pulse and millet processing, wet and dry milling of pulses. Oilseeds: processing of edible oilseeds-oil extraction and refining.

Unit 7: Fruit and Vegetable Processing

Maturity indices, ripening of climacteric and non-climacteric fruits, minimal processing of fruits and vegetables, Storage practices: Controlled atmosphere and Modified Atmosphere, hypobaric storage, pre-cooling and cold storage, Zero energy cool chamber, enzymes in fruit and vegetable processing, Technology of canning of fruits and vegetables, defects in canned foods, chemistry of pectin and its role in gel formation (theory of gel formation), processing technology for preparation of jams, jellies, marmalades, preserves, fruit juices, cordial, squash, RTS beverages, pickles, tomato juice, tomato ketchup, tomato puree, tomato paste, tomato sauce, plant pigments and effect of processing on chlorophyll, anthocyanin and carotenoids, Processing technology of tea, cocoa and coffee. Utilization of fruit and vegetable waste.

Unit 8: Technology of milk and milk products

Composition and nutritive value of milk, major and minor milk constituents, physico-chemical properties of milk, cooling and transportation of milk, Dairy plant operations- receiving, pre-heating, filtration/ clarification, standardization (Pearson's square method), pasteurization, UHT pasteurization, homogenization, sterilization. Special milks such as homogenized, flavoured, sterilized, recombined & reconstituted, toned & double toned milk. Condensed milk-Definition, methods of manufacture of condensed & evaporated milk; dried milk-Definition, methods of manufacture of skim & whole milk powder, instantization. Cream- Definition, classification, composition, cream separation, neutralization,

sterilization, pasteurization & cooling of cream, Butter- Definition, composition, methods of manufacture, defects in butter. Ice cream- Definition, nutritive value, methods of manufacture. Cheese: Definition, composition, classification, methods of manufacture of Cheddar cheese, curing process, cottage and processed cheese, defects in cheese.

Unit 9: Technology of meat/fish/poultry products

Miscroscopic structure of meat tissue, handling and ante-mortem inspection, stunning methods, slaughter-pithing and sticking, poultry processing, post-mortem changes in muscle and its conversion to meat, development of rigor mortis, resolution of rigor and tenderization of meat, mechanism of tenderization. Lean meat quality, pigments and changes in meat colour, curing, smoking, freezing and canning of meat, Composition and structure of fish, post mortem changes in fish, handling, freezing, and canning of fish, preparation of fish protein concentrate, fish oil and fish sausage, Structure, composition of eggs, egg proteins, factors affecting egg quality and evaluation of egg quality, preservation of eggs using coating, thermostabilization, and refrigeration.

Unit 10: Food Packaging and additives

Functions of packaging and packaging materials, Types of packaging materials: Paper: types of papers and their testing methods; Glass: composition, types of closures, methods of bottle making; Metals: Tinplate containers, tinning process, components of tinplate, tin free steel (TFS), types of cans, aluminum containers, lacquers; Plastics: types of plastic films, biodegradable plastics. Tetra packs- its structure and application in food processing. Barrier properties of packaging materials: gas transmission rate (GTR), water vapour transmission rate (WVTR), Active and intelligent packaging, Antimicrobial food packaging, biodegradable packaging. Nutritional labelling requirements of foods, Definition and classification of additives, natural and synthetic colorants used in foods, flavour enhancers and sweeteners used in foods.