

# Syllabus for Entrance Examination – M. Tech. in Food Engineering and Technology

2024-25

1. Chemical composition of foods in general, proportionate analysis of foods, chemistry of major food constituents such as proteins, lipids, polysaccharides, their physicochemical and nutritional profile, as well as changes therein on processing and minor constituents such as vitamins and minerals with respect to physiological functions, deficiency symptoms, food sources, and the effect of processing therein, role of water in foods, water activity, natural pigments, flavor constituents, gelling agents, phyto-constituents, nutraceuticals
2. **Basics of Human Nutrition:** Energy value of foods, calculation of energy value based on proximate composition of foods, daily energy need of body for basal metabolism, physical activity and diet induced thermogenesis, energy balance, B. M. I.; role of carbohydrates in nutrition including dental caries, lactose intolerance, galactosemia, dietary fiber, resistant starch, glycemic index of foods, prebiotics including oligosaccharides; role of proteins in nutrition including essential amino acids, protein quality, complete proteins, animal and plant sources of proteins, protein calorie malnutrition, protein quality estimation methods including in vivo and in vitro; role of lipids in nutrition including fat digestion, absorption, saturated fats, medium chain triglycerides, PUFAs as essential fatty acids, omega 6 and omega 3 fats, cholesterol, plant sterols; role of micronutrients in nutrition including fat and water soluble vitamins and minerals; role of water and electrolytes, rehydration therapy; assessment of nutritional status; lifecycle nutrition; sports nutrition; food fortification; effect of food processing and storage on nutrients; nutraceuticals and functional foods; nutrigenomics
3. General biochemistry- metabolic pathways related to carbohydrates, lipids and proteins, enzymes-classification, kinetics, activators, inhibitors, nucleic acids, DNA structure and replication, RNA transcription, protein synthesis, mutation, generic code, gene expression regulation
4. General and Food Microbiology encompassing fermentation and spoilage of the entire range of food commodities
5. Food additives and ingredients and the functions thereof in food processing
6. Basic understanding of all the commodity technologies such as (cereals, legumes and grains; fruits and vegetables; dairy technology; animal product technology, plantation products), and steps in commercial manufacture and quality assurance of products thereof

7. Fundamental principles of food preservation such as thermal processing, low temperature storage, dehydration, hurdle technology, non-thermal technologies such as irradiation, high pressure processing, cold plasma etc.; chemical preservatives (antimicrobials, antioxidants), bio-preservatives, traditional preservation like fermentation, brining, pickling, syruing, smoking etc.
8. Principles of thermal processing; process time calculation, pasteurization & sterilization, canning, plank equation for freezing time
9. Basic concepts of thermodynamics; heat transfer, momentum transfer, mass transfer, fundamentals of food rheology, basic unit operations applied in food such as evaporation, drying, size reduction, homogenization, centrifugation, filtration, extraction, membrane processing
- 10. Food Packaging:** functions of packaging, levels of packaging, materials used, their properties, food applications of these materials, factors affecting shelf life of packaged foods, food package labelling, package testing methods for different properties, retort packaging, aseptic packaging, MAP, active packaging, intelligent packaging, microwaveable packaging, edible coatings and films, biodegradable packaging, migration and scalping
11. Principles of analysis of food constituents and processed foods- chemical and instrumental
12. Fundamentals of Fermentation Technology and Food Engineering
13. Waste management in food processing
14. Nutraceuticals and their functions

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