# LIST OF ENTRANCE EXAM QUESTIONS

FOR THE INTERNATIONAL MASTER'S DEGREE PROGRAM

ITMO

## FOODTECH

1. The main provisions of the state policy in the field of healthy nutrition.
2. Classification of modern food products.
3. Nutritional and energy value of food.
4. The concept of a person's nutritional status and ways to correct it.
5. The energy value of the daily diet for various groups of the population.
6. Metabolism. The key stages of food metabolism are proteins, fats, carbohydrates.
7. Food intolerance — possible causes and their nature. Examples of pathologies, their therapy and prevention.
8. Principles of calculating the nutritional value of industrial products — from a set of ingredients to the finished product.
9. Which groups of compounds determine the taste and aroma of food products? What is their role in food technology? The role of aroma-forming substances in assessing the nutritional value of food.
10. What is food safety? What criteria does it consist of?
11. List the sources and ways of contamination of food raw materials and foodstuffs.
12. What are genetically modified foods?
13. The main directions of modern food biotechnology.
14. Biologically active substances of natural origin. Sources, classification, chemical and biological properties. Application in the food industry.
15. Microorganisms, their distribution, importance in food biotechnology.
16. Yeast. Their role in food production.
17. Fermentation: biochemical meaning, use in food production, influence on nutritional value.
18. pH: physical meaning, calculation methods, practical meaning of evaluation in food production.
19. Functional and technological properties of food additives.
20. Chemical preservatives in food technologies.
21. The role of proteins in human nutrition. What is nitrogen balance and what types of it can be observed in the body?
22. What do the concepts of nutritional and biological value of proteins include? How is the biological value of proteins determined?
23. The amino acid composition of proteins of plant origin. The daily need of the human body for proteins.
24. Properties of amino acids.
25. The specific role of individual amino acids (cysteine, tyrosine, phenylalanine, methionine, glutamic and aspartic) in the body.
26. How are biologically active peptides classified according to their functions in the body and in the composition of food?
27. List the main functional properties of proteins. What is their role in the technological processes of food production?
28. Methods of qualitative and quantitative determination of proteins.
29. Carbohydrates. Classification. The physiological role of carbohydrates.
30. What are digestible and indigestible carbohydrates? Their functions in the human body.
31. Dietary fiber, raw materials, consumption. Main components
32. Methods for determining carbohydrates.
33. The role of carbohydrates in food raw materials and food products.
34. In which food technologies is the fermentation process used?
35. The process of caramelization.
36. The process of melanoidin formation. Factors affecting the formation of melanoidin products.
37. What food technologies use hydrolysis of polysaccharides?

38. Definition of the concept of "lipids" (fats and oils). What groups of substances can they be divided into? Examples of the main groups of lipids.
39. Determination of hydrolysis reactions, hydrogenation and transesterification of oils and fats. What is their role in technology?
40. Define the concept of "fat oxidation". What is its mechanism and what factors influence the oxidation of oils and fats? What is the role of antioxidants in fat oxidation?
41. Methods of isolation and analysis of fats.
42. The role of fats and their structural components in nutrition.
43. What chemical elements are macronutrients? What functions do minerals perform in the human body?
44. The role of calcium in the human body?
45. What chemical elements belong to trace elements and what are their functions in the human body? What role does iron play in the human body, and in what foods does it contain?
46. What consequences can be observed with iodine deficiency in the body and how can this be avoided?
47. What types of technological processing of raw materials and food products contribute to the loss of minerals?
48. What methods of determining the content of macro- and microelements do you know?
49. Classification of vitamins. Define this group of chemical compounds.
50. Water-soluble vitamins.
51. Fat-soluble vitamins.
52. Physiological significance and need. The role of water- and fat-soluble vitamins in nutrition.
53. Fortification of food.
54. The content of vitamins in raw materials and finished products. Ways to preserve vitamins.
55. Functions of water in food products.
56. Free and bound moisture.
57. Water activity. How are food products divided depending on the amount of water activity?
58. The role of ice in food stability.
59. The importance of water activity for food stability. How does the activity of water affect the microbiological spoilage of food

## RECOMMENDED LITERATURE (IN ENGLISH)


1. Экспертиза специализированных пищевых продуктов. Качество и безопасность: учебное пособие / Л. А. Маюрникова, В. М. Позняковский, Б. П. Суханов, Г. А. Гореликова. — 2-е изд. — Санкт-Петербург: ГИОРД, 2016. — 448 с. — ISBN 978-5-98879-189-9. — Текст: электронный // Лань: электронно-библиотечная система. — URL: https://e.lanbook.com/book/69878
2. Богатырев С. А., Михайлова И. Ю. Технология хранения и транспортирования товаров. Учебное пособие: Дашков и К°; Москва; 2009 ISBN 5-394-00186-3 978-5-394-00186-4
3. Шлейкин, А. Г. Введение в биотехнологию: учебное пособие / А. Г. Шлейкин, Н. Т. Жилинская. — Санкт-Петербург: НИУ ИТМО, 2013. — 95 с.
4. P.M, Visakh. (2014). Advances in Food Science and Technology. URL: https://www.researchgate.net/publication/260165691_Advances_in_Food_Science_and_Technology/citation/download
5. Pometto, A., Shetty, K., Paliyath, G., & Levin, R.E. (Eds.). (2005). Food Biotechnology (2nd ed.). CRC Press. https://doi.org/10.1201/9781420027976
6. Byong H. Lee Fundamentals of Food Biotechnology, 2nd Edition February 2015 Wiley-Blackwell 544 Pages ISBN: 978-1-118-38495-4