

South Ural State University

Institute of Sport, Tourism and Service

Department of Food Technology and Organization of Public Catering

“Functional Foods and Nutrition”

Studying Programme for bachelor’s degree (BSc.)

Study period: 4 years (8 semesters)

Degree: Bachelor (BSc.)

Specialization: Functional Foods Nutrition

Language: English

Instructor: Prof. El-Sohaimy Sobhy

Level: International

Background

Students who love science with a desire to learn and educate the most attractive field in the present; they will be interested to study the importance of functional food to human nutrition and health, as it is one of the most recent attractive sciences worldwide. The Functional Foods and Nutrition field is expected to increase 21 percent from 2012-2022. By earning a bachelor's in Functional Foods at South Ural State University, students will be able to take the first step toward becoming registered Functional Food professionals. Through this program students will gain an understanding of the relationship between diet and human health and be able to apply that knowledge in their career. This program will be a unique program in Russian Federation to prepare specialists in functional foods, which makes it a perfect for working adults. Graduates of this program may choose from a variety of places to work including major medical

centers, hospitals, public health settings, community agencies, private consulting firms, higher education, or business and industry, Pharmaceutical companies, and restaurants.

Program description:

This program will describe functional foods and nutrition, including their health benefits, development, and regulation. Functional foods provide health benefits beyond our basic nutrient requirements. These benefits improve the quality of life by promoting optimal health and reducing the risk of chronic diseases. This program will explore the components of functional foods and highlight key mechanisms that may counteract current health issues and diseases. Engaging on the major challenge nowadays for identifying how functional foods and food ingredients might help prevent chronic disease or optimize health, reducing healthcare costs and improving the quality of life for many consumers. An emerging discipline that will have a profound effect on future functional foods research and development efforts is *nutrigenomics*, which investigates the interaction between diet and development of diseases based on an individual's genetic profile

Program learning outcomes:

Upon completion of this course, students will be able to critically

- Describe the molecular pathways involved in the development of chronic diseases
- Evaluate the health implications of current functional foods
- Develop the concept for a functional food product
- Define functional foods and nutraceuticals
- Learn how novel treatment of important diseases may be addressed through improved nutrition or the development of targeted health promoting foods and beverages.
- Describe the education and research on the health benefits of functional foods and nutraceuticals, identifying strengths, limitations, and future directions
- Describe the international regulations with respect to functional foods and nutraceuticals.

- Develop skills in teaching and oral communication by giving an intensive education, research, and presentation on the topic of functional foods.
- Working as high skilled specialists in the functional food industry and research

Curriculum - BSc in Functional Foods and Nutrition

The 4 years bachelor's degree in Functional Foods and Nutrition requires the successful completion of 1704 hours. The program requires 1404 hours of major courses, 300 hours of general educational courses.

I. Required Major Courses:

1. Intro to Human Nutrition I (32hrs Theoretical+18hrs Lab)- 2nd &3rd semester
2. Advanced Human Nutrition II (32hrs Theoretical+18hrs Lab)- 5th &6th
3. Intro to Biochemistry I (32hrs Theoretical+18hrs Lab)-1st semester
4. Advanced Biochemistry II (32hrs Theoretical+18hrs Lab) 2nd semester
5. Protein and peptide chemistry (32hrs Theoretical+18hrs Lab)- 3rd semester
6. Protein metabolism (32hrs Theoretical+18hrs Lab)-5th semester
7. Chemistry of Lipids (32hrs Theoretical+18hrs Lab)- 6th semester
8. Lipid metabolism (32hrs Theoretical+18hrs Lab)- 6th semester
9. Chemistry of carbohydrates (32hrs Theoretical+18hrs Lab) 7th semester
- 10.Carbohydrate metabolism (32hrs Theoretical+18hrs Lab) 7th semester
- 11.Enzyme chemistry I (32hrs Theoretical+18hrs Lab)- 7th semester
- 12.Enzyme chemistry II (32hrs Theoretical+18hrs Lab)- 8th
- 13.Chemistry of vitamins (32hrs Theoretical+18hrs Lab) 7th
- 14.Chemistry of vitamins II (32hrs Theoretical+18hrs Lab)- 8th
- 15.Nutrition in the Life Cycle (32hrs Theoretical+18hrs Lab) 7th & 8th
- 16.Principles of Food Science I (32hrs Theoretical+18hrs Lab) 1st & 2nd
- 17.Food science advanced II (32hrs Theoretical+18hrs Lab)2nd & 3rd
18. Intro to functional Foods I (32hrs Theoretical+18hrs Lab) 2nd
- 19.Functional Foods advanced II (32hrs Theoretical+18hrs Lab) 3rd
- 20.Community Nutrition I (32hrs Theoretical+18hrs Lab)3rd

21. Community nutrition II (32hrs Theoretical+18hrs Lab) 4th
22. Nutritional Biochemistry I (32hrs Theoretical+18hrs Lab) 5th
23. Nutritional Biochemistry II (32hrs Theoretical+18hrs Lab) 6th
24. Sport Nutrition I (32hrs Theoretical+18hrs Lab) 4th
25. Sport Nutrition II (32hrs Theoretical+18hrs Lab) 5th
26. Applied Nutrition I (32hrs Theoretical+18hrs Lab) 1st
27. Applied Nutrition II (32hrs Theoretical+18hrs Lab) 2nd
28. Natural Bioactive compounds and human health (32hrs Theoretical+18hrs Lab)
4th and 5th
29. Intro to Food Service Management I (32hrs Theoretical+18hrs Lab) 1st
30. Risk Management in Food production (32hrs Theoretical+18hrs Lab) 2nd
31. Phenolic compounds and flavonoids (32hrs Theoretical+18hrs Lab) 4th
32. Antioxidants and human health (32hrs Theoretical+18hrs Lab) 5th
33. Food service systems (32hrs Theoretical+18hrs Lab) 5th
34. Food Production technologies I (32hrs Theoretical+18hrs Lab) 6th
35. Food Production technologies advanced II (32hrs Theoretical+18hrs Lab) 7th
36. Nutrition Education (32hrs Theoretical+18hrs Lab) 7th
37. Analytical Instrumentation for Food Analysis (32hrs Theoretical+18hrs Lab) 6th
38. Experimental Functional Food (32hrs Theoretical+18hrs Lab) 4th
39. Food microbiology I (32hrs Theoretical+18hrs Lab) 1st
40. Sustainable food chain (32hrs Theoretical+18hrs Lab) 2nd
41. Food born pathogen (32hrs Theoretical+18hrs Lab) 3rd
42. Management of Food Systems II (24hrs Theoretical+12hrs Lab) 3rd
43. Directed Professional Independent Study (32hrs Theoretical+18hrs Lab) 1st
44. Concept of malnutrition, health, immunity by functional food (32hrs
Theoretical+18hrs Lab) 5th
45. Educational Biostatistics (32hrs Theoretical+18hrs Lab) 2nd
46. Food safety and quality control (32hrs Theoretical+18hrs Lab) 1st & 2nd

47. History of functional foods and the potential for the future. (32hrs Theoretical+18hrs Lab)1st
48. Identification and functions of bioactive components in food. (32hrs Theoretical+18hrs Lab) x 5th & 6th semesters
49. Plant originated functional foods (32hrs Theoretical+18hrs Lab) 4th
50. Animal originated functional foods (32hrs Theoretical+18hrs Lab) 5th
51. Microbial originated functional foods (32hrs Theoretical+18hrs. Lab) 6th
52. Functional foods and public health (32hrs Theoretical+18 hrs. Lab) 6th
53. Functional food and disease prevention (32hrs Theoretical+18hrs Lab) 7th
54. Principles of Designing and formulation of functional foods (32hrs Theoretical+18hrs Lab)4th
55. Functional food marketing (32hrs Theoretical+18hrs Lab)6th
56. Nutrition toxicology (32hrs Theoretical+18hrs Lab) 7th
57. Food analysis (32hrs Theoretical+18hrs Lab)1st
58. Consumers behavior (32hrs Theoretical+18hrs Lab) 1st
59. Advanced Nutrition (32hrs Theoretical+18hrs Lab) 5th
60. Diet, Microbiome, and Health (32hrs Theoretical+18hrs Lab)6th
61. Food supply and sustainability (32hrs Theoretical+18hrs Lab)2nd
62. Food Innovation I (32hrs Theoretical+18hrs Lab)2nd
63. Food Innovation I (32hrs Theoretical+18hrs Lab)3rd
64. Child and teenage nutrition (32hrs Theoretical+18hrs Lab) 4th
65. Advanced concepts in sports nutrition (32hrs Theoretical+18hrs Lab) 6th
66. General Biology (32hrs Theoretical+18hrs Lab)1st
67. General Chemistry (32hrs Theoretical+18hrs Lab)1st
68. Nutraceutical Chemistry (32hrs Theoretical+18hrs Lab)6th
69. Nutrition and Behavior (32hrs Theoretical+18hrs Lab)
70. Clinical Nutrition I (32hrs Theoretical+18hrs Lab)7th
71. Clinical Nutrition II (32hrs Theoretical+18hrs Lab)8th

72. Physical Activity and Health (32hrs Theoretical+18hrs Lab)5th
73. Exercise Physiology (32hrs Theoretical+18hrs Lab)6th
74. Exercise Metabolism (32hrs Theoretical+18hrs Lab)7th
75. Food Borne Pathogens (32hrs Theoretical+18hrs Lab)2nd
76. Flavor Chemistry (32hrs Theoretical+18hrs Lab)1st
77. Sensory Evaluation (32hrs Theoretical+18hrs Lab)1st
78. Principles of texture analysis (32hrs Theoretical+18hrs Lab)2nd
79. Analysis of Nutrition Data (32hrs Theoretical+18hrs Lab)8th
80. Introduction to Bioinformatics (32hrs Theoretical+18hrs Lab) 2nd
81. Biochemistry of Macromolecules (32hrs Theoretical+18hrs Lab)3rd
82. General Genetics I (32hrs Theoretical+18hrs Lab) 3rd
83. General Genetics II (32hrs Theoretical+18hrs Lab) 4th
84. Sanitation and human health 3rd
85. Fundamental Molecular Biology of the gene I (32hrs Theoretical+18hrs Lab) 5th
86. Fundamental Molecular Biology of the gene II (32hrs Theoretical+18hrs Lab) 6th
87. Russian language (32x2=64) 1st & 3rd
88. Seminar every semester (8 seminars x 36hr.= 288) 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, and 8th.
89. Guest lecturer (8 semester x 36=288) 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, and 8th.
90. Graduation Project (2 semesters projects-144 hrs.= 2 credits) (The project is broken into **six individual assignments** that are due at specific dates throughout **the 2 semesters (7 & 8)**. This format will help give students enough time to complete the project components as well as give the instructor the opportunity to provide feedback for improvement. By the end of the semester, students will edit their six assignments and compile them into one **Graduation Project** for the final submission. (30 marks)

II. Required general Courses:

Students are required to complete the following 10 science courses.

1. Introduction to analytical Chemistry (32hrs Lec+18hr.Lab) 2nd
2. Introduction to Organic Chemistry (32hrs Lec+18hr.Lab) 1st
3. Inorganic chemistry (32hrs Lec+18hr.Lab) 3rd
4. Plant Anatomy and Physiology (32hrs Lec+18hr.Lab) 1st
5. Animal anatomy and physiology (32hrs Lec+18hr.Lab) 2nd
6. General Microbiology (32hrs Lec+18hr.Lab) 1st
7. Physics (32hrs Lec+18hr.Lab) 1st
8. Mathematics (32hrs+18Practice) 2nd
9. Philosophy (32 hrs.) 3rd
10. History (32hrs) 3rd
11. Fundamental information technology (32hrs Lec+18hr.Lab) 4th
12. Economy (32hrs) 4th
13. English language general (32hrs Lec+18hr.Lab) 3rd
14. English language scientific (32hrs Lec+18hr.Lab) 5th

Grading system

Item	%
Class attendance	5
Class Participation/Assignments	5
Exams	
Exam#1 – Mid-Term exam	25
Exam #2 – Final Exam (non-cumulative)	25
Written Projects and Class Presentations	30
Extra credit – Guest speaker report(s) (One guest speakers every semester)	10
Total	100

Grade	% Total points
A	>93.0
A-	90.0 - 92.9

B+	87.0 - 89.9
B	83.0 - 86.9
B-	80.0 - 82.9
C+	77.0 - 79.9
C	73.0 - 76.9
C-	70.0 - 72.9
D+	67.0 - 69.9
D	60.0 - 66.9
F	<59.9

PROGRAMME POLICIES AND EXPECTATIONS FOR STUDENT PERFORMANCE

Graduates of the department receive degrees as food science professionals, and professional behavior constitutes a key component of our academic programs. The department expects all students – at any level and in any program to:

- Attend classes.
- Come to class on time.
- Complete reading
- Readings on schedule, when applicable.
- Complete all course Readings on time.
- Write using correct format, grammar, spelling, and reference style.
- Turn in work that meets ethical standards and is not plagiarized.
- Take responsibility for obtaining and making up missed work.
- Finish all course work by the end of the semester.
- Inform instructors in advance if classes need to be missed.
- Provide documentation to support reasons for missing class, assignments, and examinations.
- Takes the above standards into consideration and applies penalties for failure to meet them.

- Instructors are not required to read or give a passing grade to work that is late, incomplete, or inadequately prepared.

References

1. Vaclavik V, Christian EW. 2014. Essentials of food science, 4 ed. New York Springer.
2. Aluko RE. 2012. Functional foods and nutraceuticals. New York: Springer.
3. Danik M Martirosyan, 2015. Functional Food Textbook Volume 1: *Introduction to Functional Food Science (Third Edition)*
4. McGuire M, Beeman K. 2011. Nutritional Sciences: from fundamentals to food, 2nd ed: Wadsworth Cengage Learning
5. Rotimi E. Aluko 2012. Functional Foods and Nutraceuticals (Food Science Text Series) 2012th Edition.
6. Joyce I. Boye 2015. Nutraceutical and Functional Food Processing Technology (IFST Advances in Food Science) 1st Edition
7. D. Julian McClements and Eric A Decker, 2009. Designing Functional Foods: Measuring and Controlling Food Structure Breakdown and Nutrient Absorption (Woodhead Publishing Series in Food Science, Technology and Nutrition) 1st Edition
8. Danik M Martirosyan 2017. Functional Foods for Chronic Diseases: Obesity, Diabetes, Cardiovascular Disorders and AIDS: Volume 4

Prepared by

El-Sohaimy Sobhy Ahmed

Professor of Food Biochemistry