Co-funded by
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Open Food Innovation University (OFINU)

DESCRIPTION OF STUDY MODULE
"NEW FOOD PRODUCT DEVELOPMENT"

2024

Summary

The study course is elaborated within the project “Open Food Innovation University" (OFINU), being in implementation with support of the European Union Erasmus+ Programme.

Overall objective of the project - to modernise food innovation and technology related higher education in Uzbekistan and Tajikistan, thereby increasing the quality and ensuring relevance of the higher education to the needs of the socio-economic growth of the countries concerned and especially of their regions.

Full partners:
- Lead partner: Latvia University of Life Sciences and Technologies
- Uzbekistan: Samarkand Agro-innovations and Research University, Andijan Institute of Agriculture and Agro-technologies
- Tajikistan: Technological University of Tajikistan, Kulob Institute of Technology and Innovation Management, Isfara Branch of the Technological University of Tajikistan
- Slovakia: Slovak University of Agriculture in Nitra

Associated partners in Uzbekistan:
- A group of companies "AGROMIR"
- "Navigul" MCHJ QK
- “Samarqand don mahsulotlari” JC (Samarkand grain products)

Associated partners in Tajikistan:
- CJSC “Combinati Shiri Dushanbe”
- LTD "Orion Rustam"
- Association of Entrepreneurs of Khatlon

The project implementation period: 01/02/2024 - 31/01/2027.

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INTRODUCTION

Study module "**NEW FOOD PRODUCT DEVELOPMENT**" has been developed for the open university sessions. Every audience from the university - students and lecturers, from food industry (the middle and higher-level specialists) and anyone interested who wants to learn about the development process of new food products, can participate. The study module is designed based on the basic principles of student-cantered training using the latest training methods.

The training of the module is organized in 20% theoretical lessons and 80% practical lessons. During the practical lessons, professional problem situations are solved and solutions for new ideas and products are found. Students with different knowledge, professional experience, but with a high degree of interest ensure mutual communication and the learning process by learning from each other.

Aim and objectives of the study module

The study module aims to provide knowledge of the new product development process and the role of enterprises and research. Acquainted with idea generation methods, product prototype development, and testing methods. As part of the commercialization phase, it creates the design of the new product and learns the sales methods and opportunities.

Learning outcomes

Knowledge and understanding of the new product development process in enterprises or research, as well as an understanding of key concepts and regularities.
Skills Ability to develop new food product development concepts, and discuss and justify new product needs and quality requirements.
Competence to collect and analyze information, deal with the industry and product development-related problems, and make decisions on new product development progress of the work team: practical works, independent work, and final workshop.

Study Plan for module "NEW FOOD PRODUCT DEVELOPMENT"

Themes	Number of hours			
	Total	Lectures	Practical works / seminars	Independent works
Innovation role in science and entrepreneurship	29/36/31	4/4/9	0/4/2	25/28/22
Idea generation	50/52/54	5/8/12	20/16/22	25/28/22
Product development	46/52/49	3/4/8	18/20/20	25/28/22
Commercialization	39/42/42	4/4/9	10/10/11	25/28/22
Evaluation of new product development process.	32/ 41/34	2/4/5	6/10/8	24/27/21
Hackathon "InnoFood"	47/47/50		24/24/24	23/23/ 21
TOTAL	243/270/260	18/24/43	78/84/87	147 / 162/130

Thematic Study Plan for module "NEW FOOD PRODUCT DEVELOPMENT"

Date, Time	Study form	Topic	Lecturer
Theme 1. Role of innovation in science and entrepreneurship			
Day 1	Lecture (1h)	Introduction to the course, participants and awareness of innovation.	Dr. sc. ing. Assoc.prof. D. Kļava
	Lecture (3h)	Innovation, types of innovation and their differences. Innovation in a European and global context. Role of development of new products in food industry and research institutes. Development of new products in research centres and their role in the development of the food production sector. The European Union support system for innovation development, differences with local market approach. Transfer of knowledge and technology in a collaborative model science - production - science. Process of developing new products in a food production company. Role of innovation in product life cycle and business development. Strategic and conceptual modelling of new products in a company. **HW** Tendencies in Food industries and Food science – each student finds and describes 5 new trends and creates a presentation.	Dr. sc. ing. Assoc.prof. D. Kļava Dr. sc. ing. E. Kozlinskis
Theme 2. Idea generation			
Day 2	Seminar (4h)	Discussion about new trends in food industries in a European and global context.	Dr. sc. ing. E. Kozlinskis Dr. sc. ing. Assoc.prof. D. Kļava
	Lecture (1h)	New product development process - idea, prototype, development, and commercialisation. Creative thinking methods and their application in new product development. Implementing a conceptual approach to new product development.	
	Practical work (2h)	Group work - develop a product concept.	
Day 3	Lecture (1h)	Consumer role in the new product development process. Business Model Canva as a tool for idea development.	Dr. sc. ing. Assoc.prof. D. Kļava
	Practical work (2h)	Consumer profile development. Evaluation of consumer needs and value of new products using Business Model Canva.	

	Practical work (4h)	Ideas generation techniques. Using Ideas generation techniques, e.g., brainstorming, analogical reasoning, random name, etc. for new ideas.	Dr. sc. ing. Assoc.prof. D. Kļava
Day 4	Practical work (4h)	Evaluation and selection of ideas. Description of ideas.	Dr. sc. ing. Assoc.prof. D. Kļava
	Lecture (2h)	Architecture and design of the new idea, appropriately of actuality in the food industry. Prototyping techniques and methods used in development stages. **HW** New product architecture and design development.	
Day 5	Seminar (1h)	Presentation and discussion of new product design.	Dr. sc. ing. Assoc.prof. D. Kļava
	Lecture (2h)	Food product sensory properties (appearance, aroma, taste, consistency / structure) as food design elements. Identification of consumer expectations, needs and benefits. Consumer methods for food product sensory evaluation (line scale, hedonic scale, CATA, RATA, Just about Right, Mapping/Napping u.c.).	Dr. sc. ing. professor E. Straumite
	Practical work (2h)	Sensory evaluation methods used in consumer studies. **HW** - Study of scientific articles about sensory evaluation methods used in consumer studies.	
	Seminar (1h)	A discussion about sensory evaluation methods used in consumer studies.	Dr. sc. ing. professor E. Straumite
	Lecture (1h)	Emotions in creating and choosing new products. Principles of organisation of sensory evaluation (definition of aim, selection of samples, selection of panellists, etc.). Sensory claims as a provider of information to the consumer. Food pairing.	
Theme 3. Product development			
Day 6	Lecture (3h)	Product development process. Developing the required documentation for the new product. Intellectual property rights protection.	Dr. sc. ing. Assoc.prof. D. Kļava
	Practical work (5h)	Developing technology documents.	

Day 7	Practical work (5h)	Development of a label and packaging sample for the new product.	Dr. sc. ing. professor E. Straumite
	Seminar (2h)	Presentation of packaging and label sample.	
Day 8	Practical work (4h)	The prototype evaluation phase. Developing, testing and finalising prototypes.	Dr. sc. ing. Assoc.prof. D. Kļava
	Seminar (2h)	A discussion about the product's technological documentation.	
Theme 4. Commercialisation			
Day 9	Lecture (4h)	The commercialisation phase of new products. Product sales strategy. Integrated marketing for sales.	Dr. sc. ing. Assoc.prof. D. Kļava
	Practical work (3h)	Communication elements for marketing. **HW** Development of a plan of sales activities for the new product.	
Day 10	Practical work (4h)	Content of marketing communication. Marketing activities plan.	Dr. sc. ing. Assoc.prof. D. Kļava
	Seminar (3h)	A discussion about marketing activities plan.	
Theme 5. Evaluation of new product development process.			
Day 11	Lecture (2h)	SWOT analysis for new product development. Risk identification and evaluation. Using criticism to improve your product.	Dr. sc. ing. Assoc.prof. D. Kļava
	Practical work (4h)	SWOT analysis for project evaluation.	
	Seminar (2h)	A discussion about SWOT analysis.	
Theme 6. Hackathon "InnoFood"			
Day 12 (24h)	Hackathon "**InnoFood**" - to solve a problem or identify new opportunities for food industry.		

Themes and their summary in study module "NEW FOOD PRODUCT DEVELOPMENT"

Theme 1. Role of innovation in science and entrepreneurship

Issues to be covered in the lectures

1. Innovation, types of innovation and their differences. Innovation in a European and global context. Role of development of new products in food industry and research institutes.
2. Development of new products in research centres and their role in the development of the food production sector. Support system for innovation development, differences with the local market approach. Transfer of knowledge and technology in a collaborative model science - production - science.
3. Process of developing new products in a food production company. Role of innovation in product life cycle and business development. Strategic and conceptual modelling of new products in a company.

Issues to be covered in the seminar

1. Discussion about new tendencies in food industries in a European and global context.
2. New tendencies in Food Sciences.
3. The common and the different in food product innovations in Central Asia, Europe and the World.
4. The common and the different in food industry and research area.

Topics of independent work

1. The latest trends in various food industries (milk processing, beverage production, meat processing, grain processing, fruit and vegetable processing).
2. Gathering information about circular economy possibilities in the development of new products.
3. Gathering information from scientific articles about fermentation processes in food production.
4. Gathering information from scientific articles on protein sources and uses in the food industry.
5. The use of by-products in the development of new functional products

Literature and data bases on the theme

1. Law of the Republic of Uzbekistan, dated 24.07.2020. No. LRU-630 "On Innovative Activity"
2. Science Direct, research article data base (2024, June). https://www.sciencedirect.com
3. Scopus, research article database (2024, June). https://www.scopus.com/search/form.uri?display=basic&zone=header&origin=searchbasic#basic
4. EIT Food accelerates innovation to build a future (2024, June). https://www.eitfood.eu

Theme 2. Idea generation

Issues to be covered in the lectures

1. New Product Development Process - idea, prototype, development, commercialization. Creative thinking methods and their application in new product development. Implementing a conceptual approach to new product development.
2. Consumer role in the new product development process. Business Model Canva as a tool for idea development.
3. Ideas generation techniques, applying them for potential developments.
4. Architecture and design of the new idea, appropriately of actuality in the food industry.
5. Food product sensory properties (appearance, aroma, taste, consistency / structure) as food design elements. Identification of consumer expectations, needs and benefits. Consumer methods for food product sensory evaluation (Line scale, hedonic scale, CATA, RATA, Just about Right, Mapping/Napping u.c.).
6. Emotions in creating and choosing new products. Principles of organization of sensory evaluation (definition of aim, selection of samples, selection of panelists, etc.). Sensory claims as a provider of information to the consumer. Food pairing.

Issues to be covered in the practical works

1. Using a context map and developing a product development plan.
2. Consumer profile development for new product development.
3. Using Ideas generation techniques (Brainstorming, Analogical Reasoning, Random Name, etc) for new ideas.
4. Evaluation and selection of ideas. Description of ideas.
5. Evaluate consumer need and value of new products ideas using Business Model Canva.
6. Sensory evaluation methods used in consumer studies.

Topics of independent work

1. Analyse the differences, needs and pains of various target market groups.
2. To study the application possibilities for the design development of food products.
3. Study of scientific articles about sensory evaluation methods used in consumer studies.

Literature and data bases on the theme

1. Biró, B., Sipos, M.A., Kovács, A., Badak-Kerti, K., Pásztor-Huszár, K.; Gere, A. (2020). Cricket-Enriched Oat Biscuit: Technological Analysis and Sensory Evaluation. Foods.
2. Głuchowski, A., Czarniecka-Skubina, E., Kostyra, E., Wasiak-Zys, G., Bylinka, K. (2021). Sensory Features, Liking and Emotions of Consumers towards Classical, Molecular and Note by Note Foods. Foods.
3. Grasso, S., Jaworska, S. (2020). Part Meat and Part Plant: Are Hybrid Meat Products Fad or Future?. Foods.
4. Guzek, D., Głabska, D., Sajdakowska, M., Gutkowska, K. (2020) Analysis of Association between the Consumer Food Quality Perception and Acceptance of Enhanced Meat Products and Novel Packaging in a Population-Based Sample of Polish Consumers. Foods.
5. Kalumbi, M., Matumba, L., Mtimuni, B., Mwangwela, A., Gama, A.P. (2019). Hydrothermally Treated Soybeans Can Enrich Maize Stiff Porridge (Africa's Main Staple) without Negating Sensory Acceptability. Foods.

6. Kumar, R., Chambers, E., Chambers, D., Lee, J. (2021). Generating New Snack Food Texture Ideas Using Sensory and Consumer Research Tools: A Case Study of the Japanese and South Korean Snack Food Markets. Foods.
7. Ruiz-Capillas, C., Herrero, A., Pintado, T., Delgado-Pando, G. (2021). Sensory Analysis and Consumer Research in New Meat Products Development. Foods.
8. Silva, F., Duarte, A.M., Mendes, S., Borges, P., Magalhães, E., Pinto, F.R., Barroso, S., Neves, A., Sequeira, V., Vieira, A.R. (2020). Adding Value to Bycatch Fish Species Captured in the Portuguese Coast—Development of New Food Products. Foods.
9. Swiader, K., Florowska, A., Konisiewicz, Z., Chen, Y.-P. (2020). Functional Tea-Infused Set Yoghurt Development by Evaluation of Sensory Quality and Textural Properties. Foods.
10. Swiader, K., Marczewska, M. (2021). Trends of Using Sensory Evaluation in New Product Development in the Food Industry in Countries That Belong to the EIT Regional Innovation Scheme. Foods.
11. Szymandera-Buszka, K., Waszkowiak, K., Jedrusek-Golinska, A., He´s, M. (2020) Sensory Analysis in Assessing the Possibility of Using Ethanol Extracts of Spices to Develop New Meat Products. Foods.
12. Tao, R., Cho, S. (2020). Consumer-Based Sensory Characterization of Steviol Glycosides (Rebaudioside A, D, and M). Foods.

Theme 3. Product development

Issues to be covered in the lectures

1. Product development process. Developing the required documentation for the new product.
2. Prototyping techniques and methods used in development stages.
3. Intellectual Property Rights Protection.
4. Develop a label and requirements of information for consumer.
5. Sensory evaluation methods for new product development.

Issues to be covered in the practical works

1. Description of Technology process and quality control of new product.
2. The prototype development phase. Developing, testing and finalizing prototypes.
3. Develop a label and packaging sample for the new product.

Topics of independent work

1. Analyse (ingredients, nutrients, design, producers etc.) labelling and packaging of different food products group.
2. Latest food technology process for food innovations.
3. Quality assessment of food products (organoleptic, textural, chemical, microbiological parameters), their importance and necessity for safe food production.

Literature and data bases on the theme

1. Bennett, A. G. (2023). Critical Mapping for Sustainable Food Design: food security, equity, and justice. Routledge.
2. Jeantet, R., Croguennec T., Schuck, P., Brulé G. (2016). Handbook of Food Science and Technology 3. Food Biochemistry and Technology. Wiley Online Library.
3. David B. Audretsch, D.B. (Ed.). (2011). Handbook of research on innovation and entrepreneurship. Edward Elgar Publishing.

4. Ghosh, D., Raton, B. (Eds.). (2013). Innovation in healthy and functional foods. CRC press.

Theme 4. Commercialization

Issues to be covered in the lectures

1. The commercialization phase of new products. Strategy, business analysis, market research, marketing plan.
2. Product sales strategy. Market Mix (Product, promotion, place, price, people).
3. Integrated marketing for sales.

Issues to be covered in the practical works

1. Communication elements for marketing plan. Branding, Public reactions, Digital marketing, Content marketing.
2. Content of marketing communication.
3. Marketing activities plan.

Topics of independent work

1. Research and analysis of communication elements of other food companies - website, labels, advertising, publicity, etc.
2. Conduct market research on the product and the use of communication elements in sales.
3. Study digital tools for developing communication elements, such as Canva.com, Microsoft Publisher etc.

Literature and data bases on the theme

1. Design and books. (2024, June). www.canva.com
2. Fuller, G.W. (2011). New Food Product Development. CRC Press.
3. Kotler, Ph. (2010). Marketing 3.0: From Products to Customers to the Human Spirit (1st ed.). Wiley.

Theme 5. Evaluation of new product development process.

Issues to be covered in the lectures

1. SWOT analysis of new product development.
2. Risk identification and evaluation.
3. Using criticism to improve one's product.

Issues to be covered in the practical works

1. SWOT analysis of the new product and suggestions for improvement.
2. Strengths and weaknesses of new product.
3. Opportunities and threats of new product.

Topics of independent work

1. To study project evaluation methods and their suitability in the development of new products.
2. Search for and evaluate samples of SWOT analysis of other food innovation products.
3. Find external factors as examples of opportunities and threats.

Literature and data bases on the theme

1. Kotler, Ph. (2010). Marketing 3.0: From Products to Customers to the Human Spirit (1st ed.). Wiley.
2. Calicchio, S. (2020). Swot Analysis in 4 Steps: How to Use the SWOT Matrix to Make a Difference in Career and Business. Stephano Calicchio.
3. Speth, C. (2015). The SWOT Analysis: Develop Strengths to Decrease the Weaknesses of Your Business. 50Minutes.com.

Theme 6. Hackathon "InnoFood".

Issues to be covered in the Hackathon

Issues are coordinated individually with food producers on current topics.

Topics of independent work

According to the major topic and problem, students should find information about:

1. Topicality.
2. Possible solutions in other countries.
3. Possible solutions from a scientific point of view.
4. Latest competing solutions.

Literature and data bases on the theme

1. EIT Food accelerates innovation to build a future. (June 2024). https://www.eitfood.eu
2. Marketing & Innovation Magazine. (June 2024). https://issuu.com/eurest/docs/the_workplace_reimagined_2023 4.EitFood https://www.eitfood.eu
3. Science Direct. (June 2024). Research article data base. https://www.sciencedirect.com
4. Scopus (June 2024). Research article data base. https://www.scopus.com/search/form.uri?display=basic&zone=header&origin=searchbasic#basic

Literature sources

1. Baran, R. J., (2017) Customer relationship management: The foundation of contemporary marketing strategy (2nd ed.). Routledge/Taylor & Francis Group.
2. Bennett, Audrey G., Vokoun, J., Oxon, A. (2023). Critical Mapping for Sustainable Food Design: food security, equity, and justice. Routledge.
3. Porretta, S., Moskowitz, H., Gere, A. (2021). Consumer-based New Product Development for the Food Industry. Royal Society of Chemistry.
4. MacFie, H. (Ed.). (2007). Consumer-led food product development. Woodhead Publishing.
5. Dent, A. (2014). Product design. Thames & Hudson.
6. Ebster, C., Garaus, M. (2011). Store design and visual merchandising: Creating store space that encourages buying. Business Expert Press.
7. Fuller, G.W. (2011). New Food Product Development. CRC Press.
8. Fuller, G.W. (2016). New Food Product Development: From Concept to Marketplace, (3rd ed.). CRC Press.
9. Handbook of research on innovation and entrepreneurship / edited by David B. Audretsch ... [et al.]. Cheltenham, UK ;Northampton, MA : Edward Elgar ; c2011. xvi, 510 p. ISBN 9781848440876.
10. Audretsch, D.B. (2011). Handbook of research on innovation and entrepreneurship. Edward Elgar Publishing.
11. Healthy and Sustainable Food by EIT Food. (2014, June). https://www.eitfood.eu
12. Passos, M.L., Ribeiro, C. P., Raton, B. (2010). Innovation in food engineering: new techniques and products. CRC Press.
13. Ghosh, D., Raton, B. (2013). Innovation in healthy and functional foods. CRC Press.
14. Knorr, D. (Ed.) (2024). Innovative Food Science and Emerging Technologies. Elsevier.
15. Lorenzo O., Kawalek P., Wharton L. (2018). Entrepreneurship, innovation and technology: a guide to core models and tools. Routledge.
16. Marketing & Innovation Magazine. (2024, June). https://innovation-mag.com
17. Mailgard, H. R., Morten, C., Carr, T. B., Civille, G.V. (2006). Sensory and consumer research in food product design and development. CRC Press, Taylor&Francis Group.
18. Daim, T. (Ed.). (2019). R&D management in the knowledge era: challenges of emerging technologies. Springer.
19. Calicchio, S. (2020). Swot Analysis in 4 Steps: How to Use the SWOT Matrix to Make a Difference in Career and Business. Stephano Calicchio.
20. The European Federation of Food Science and Technologies. (2024, June). https://www.effost.org/default.aspx
21. Speth, C. (2015). The SWOT Analysis: Develop Strengths to Decrease the Weaknesses of Your Business. 50Minutes.com.
22. Toldra, F., Yada, R.Y. (Eds.). (2024). Trends in Food Science & Technology. Elsevier.

Materials needed for the implementation of the study course programme

Nr.	Material resources and equipment	Quantity / description
1.	Computer or laptop	
2.	White Board and flipchart	
3.	Data bases and books	

Methods used for the implementation of the study course programme

Nr.	Types	Methods possible to be applied
1.	Lectures	Lecture, discussion, questions - answers
2.	Practical works	Team work, brain storming, Random word, Analogies, discussion, SWOT analyse
3.	Seminars	Discussion and evaluation of data
4.	Hackathon	Planning, team work - hands – on technologies