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**Syllabus**

**BSc. Food Science and Biotechnology**

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| Subject | **FOOD PACKAGING AND STORAGE** |
| Type | Semester | ECTS | Code |
| Elective | 5 | 3 | 130FPS358 |
| Course LecturerCourse Assistant | Prof. Assoc. Dr. Violeta Lajqi Makolli: Prof. Assoc. Dr. Violeta Lajqi Makolli:  |
| Aims and Objectives | The following topics will be covered in this course: general knowledge of food packaging, concepts, classification, the main factors (external and internal) that cause food deterioration during storage, the protective role of packaging, functions, types of packaging and the main materials used for the production of packaging, as well as which packaging is used for which foods, their shape and design, packaging-food interaction, etc. Techniques, methods and machines for packaging, labelling, innovative packaging. The subject also deals with the legislative requirements for food packaging as well as the monitoring of the validity period. |
| Learning Outcomes | After completing the course, students are trained;• and gain knowledge about the packaging materials used to store food and the compatibility of food with the characteristics, type and shape of packages,• in the selection of materials for the packaging of certain food products and the possible packaging-food interaction, in the selection of innovative packaging following the legislative requirements for safe packaging and environmental protection.• explain the impact of packaging and packaging methods on the shelf life of foods; |
| Course Content | **Weekly plan** | **Week** |
| Introduction, and general knowledge, package characteristics | 1 |
| Factors that cause the deterioration of foods during their storage | 2 |
| Functions of packages | 3 |
| Packaging materials | 4 |
| Packaging materials | 5 |
| Types, forms and design of packaging | 6 |
| Labeling of food products | 7 |
| Packaging and food, selection of packaging for certain foods | 8 |
| Food packaging system and methods | 9 |
| Packaging - food interaction | 10 |
| Food packaging legislation | 11 |
| The environmental impact of packaging and protective measures | 12 |
| Presentations | 13 |
| Presentations, Repetition of the subject (or by agreement with the students’ preliminary exams can be foreseen).Study visits to packaging material production companies and packaging filling industries | 14 |
| Final exam | 15 |
| Literature/References | **Basic literature:*** Internal script/lecture.
* [N. C. Saha](https://www.barnesandnoble.com/s/%22N.%20C.%20Saha%22;jsessionid=2A4C127A512120DEDA7A91F829F53C2D.prodny_store02-atgap05?Ntk=P_key_Contributor_List&Ns=P_Sales_Rank&Ntx=mode+matchall), [Anup K. Ghosh](https://www.barnesandnoble.com/s/%22Anup%20K.%20Ghosh%22;jsessionid=2A4C127A512120DEDA7A91F829F53C2D.prodny_store02-atgap05?Ntk=P_key_Contributor_List&Ns=P_Sales_Rank&Ntx=mode+matchall), [Meenakshi Garg](https://www.barnesandnoble.com/s/%22Meenakshi%20Garg%22;jsessionid=2A4C127A512120DEDA7A91F829F53C2D.prodny_store02-atgap05?Ntk=P_key_Contributor_List&Ns=P_Sales_Rank&Ntx=mode+matchall), [Susmita Dey Sadhu](https://www.barnesandnoble.com/s/%22Susmita%20Dey%20Sadhu%22;jsessionid=2A4C127A512120DEDA7A91F829F53C2D.prodny_store02-atgap05?Ntk=P_key_Contributor_List&Ns=P_Sales_Rank&Ntx=mode+matchall), Deepak Manchanda ,
* (2022), Food Packaging Book, [Springer Nature Singapore](https://www.barnesandnoble.com/s/%22Springer%2BNature%2BSingapore%22;jsessionid=2A4C127A512120DEDA7A91F829F53C2D.prodny_store02-atgap05?Ntk=Publisher&Ns=P_Sales_Rank&Ntx=mode+matchall)
* Benjamin Muhamedbegoviç, Nils V. Juul, Midhat Jasiç (2015); Ambalazha i pakiranje hranje, Sarajevo.
* V. L. Makolli; Modelimi i proceseve difuzive përmes sipërfaqës kontaktuese të paketimeve me ushqimet për sigurinë dhe kontrollin cilësor – 2014 (ligjerata të autorizuara nga punimi i doktoratës)
* Gordon L. Robertson , Food Packaging and Shelf Life, © 2010 by Taylor and Francis Group, LLC.
* VUJKOVIĆ I., GALIĆ K., VEREŠ M., Ambalaža za pakiranje namirnica, Sveučilišni udžbenik, TECTUS, Zagreb 2007.
* DONG SUN LEE, KIT L. YAM, LUCIANO PIERGIOVANNI (2008); Food technology Science and Technology, CRC Press
* STEEL R., (ured.) Understanding and measuring the shelf-life of food, Woodhead Publiching Limited and CRC Press LLC,2004.

**Recommended reading:*** Karen A. Barnes, C. Richard Sinclair and D.H. Watson., Migration and Food Contact Materials, CRC Pres, 2007.
* Gordon L.Robertson – Food Packaging.. Botimi i II. 2009. Rinus Rijk and Rob Veraart.,
* Global Legislation for Food Packaging Materials, Second, Completely Revised Edition, 2007.
* Robertson G. L. Food Packaging Principles and Practice (2nd edition), 2006, CRC Press
* RICHARD COLES (2003) FOOD PACKAGING TECHNOLOGY, Blackwell Publishing CRC Press
* Jung H. Han (2016), INNOVATIONS IN FOOD PACKAGING, Canada, Elsevier.
* KIT L. YAM (2009), THE WILEY ENCYCLOPEDIA OF PACKAGING TECHNOLOGY, THIRD EDITION, Wilay

**Additional literature from scientific articles:*** Migration of di-(2-ethylhexyl) adipate (DEHA) and acetyl tributyl citrate (ATBC) plasticizers from PVC film into the food stimulant of isooctane: **Lajqi-Makolli, V.,** Kerolli-Mustafa, M., Malollari, I., Lajqi, J. 2015: Materialwissenschaft und Werkstofftechnik
* Migration process of some chemicals identified through food packaging ft-ir analysis: Makolli, V.L., Malollari, I., Buzo, R. 2014: Journal of Environmental Protection and Ecology, Impact factor,<http://www.jepe-journal.info/vol15-no-1-2014>
* CHEMICAL AND PHYSICAL ARRANGEMENTS AND ECOLOGICAL IMPACT ON RED WINE MICRO-OXYGENATION: R. BUZO, I. MALOLLARI, V. L. MAKOLLI, M. LUKA (CEKANI), 616, Journal of Environmental Protection and Ecology (JEPE) B.EN.A.. Greqi, Vol. 15, No. 2 (2014)
* **Lajqi, Violeta** (2021) "A review on active food packing as innovation strategies for the future," International Journal of Business and Technology: Vol. 9: Iss. 1, Article 9. DOI: 10.33107/ijbte.2021.6.3.10 Available at: <https://knowledgecenter.ubt-uni.net/ijbte/vol9/iss1/9>
* Violeta Lajqi Makolli, Ilirian Malollari, Mirela Lika: STUDY OF VARIOUS ENVIRONMENTAL CHANGES IMPACT ON PACKAGED FOOD SAFETY, International Journal of Ecosystems and Ecology Sciences (IJEES) ISSN 2224-4980, 2013 / vol 3(4) / 719-724.
* [Florije Tahiri](http://www.bksh.al/adlib/scripts/wwwopac.exe?&DATABASE=catalo&OPAC_URL=/adlib/beginner/index_al.html&LANGUAGE=2&l1=Tahiri%2c+Florije&LIMIT=0), [Musa Rizaj](http://www.bksh.al/adlib/scripts/wwwopac.exe?&DATABASE=catalo&OPAC_URL=/adlib/beginner/index_al.html&LANGUAGE=2&l1=Rizaj%2c+Musa&LIMIT=0), [Sami Behrami](http://www.bksh.al/adlib/scripts/wwwopac.exe?&DATABASE=catalo&OPAC_URL=/adlib/beginner/index_al.html&LANGUAGE=2&l1=Behrami%2c+Sami&LIMIT=0), [Violeta Makolli (Lajqi)](http://www.bksh.al/adlib/scripts/wwwopac.exe?&DATABASE=catalo&OPAC_URL=/adlib/beginner/index_al.html&LANGUAGE=2&l1=Makolli+%28Lajqi%29%2c+Violeta&LIMIT=0), [Sabit Restelic,](http://www.bksh.al/adlib/scripts/wwwopac.exe?&DATABASE=catalo&OPAC_URL=/adlib/beginner/index_al.html&LANGUAGE=2&l1=Restelica%2c+Sabit&LIMIT=0) FRAKSIONET E PLASTIKËS NË MBETURINAT KOMUNALE = PLASTIC FRACTIONS IN THE MUNICIPAL WASTE, Journal of Institute Alb-Shkenca – AKTET, 2009 / AKTET Vol. III, Nr. 2 / page286-291, ISSN 2073-2244
* Violeta Lajqi Makolli, Ilirian Malollari; FOOD SAFETY FROM POLYMER PACKAGING MATERIALS AND ITS REFLECTION TO SPECIFIC LEGISLATION, ICE-2014, 4 th International Conference of Ecosystems, Tirana, Albania, Proceedings Book, 2014 /173-178
* Violeta Lajqi Makolli, Ilirian Malollari, Mirela Lika (Cekani): STUDY OF VARIOUS ENVIRONMENTAL CHANGES IMPACT ON PACKAGED FOOD SAFETY, ICE -2013, 3rd International Conference of Ecosystems, Tirana, Albania, 2013/ Proceedings Book/ paper 318, page1115-1118, ISBN:978-9928-4068-7-3
* Violeta Lajqi Makolli, Ilirian Malollari: IMPROVING THE UNDERSTANDING OF MIGRATION THROUGH FT-IR ANALYSES OF SOME FOOD PACKAGING POLYMERS, 2nd Conference RENS2013, Shkodra, Albania, 15~16 November 2013 /Proceeding book/ page/, ISBN:978-9928-4135-5-0
* Tahiri, Florije; Lajqi, Violeta; and Tahiri, Kushtrim, "PRODUCT INGREDIENTS - ADVERTISING LABELING" (2019). UBT International Conference. 411. https://knowledgecenter.ubt-uni.net/conference/2019/events/411 [PRODUCT INGREDIENTS - ADVERTISING LABELING (ubt-uni.net)](https://knowledgecenter.ubt-uni.net/cgi/viewcontent.cgi?article=2584&context=conference)
* Consumer Perception and the Environmental Impact of Fast-Food Packaging, Azra Nuhija, Violeta Lajqi Makolli, page 258. 12th International Conference on Business, Technology and Innovation 2023 (ubt-uni.net)
* The influence of ecological packaging design on consumer perception of purchasing food products: a case study in Ulqin page. 259 Violeta Lajqi, A. Ljukovic, S. Dinaj, S. Makolli. University for Business and Technology - UBT, "12th International Conference on Business, Technology and Innovation 2023" (2023). UBT International Conference.
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**Academic integrity policy and rules of etiquette:** within the course, zero tolerance for plagiarism, copying in exams, or copying in group presentations and other learning activities. The Code of Conduct lists the behaviors allowed during the discussion, the lesson, interactivity with the teacher, etc. Cell phones (smartphones) and other electronic devices (eg iPods) must be turned off (or set to vibrate) and not displayed during class. Following the rules and instructions of the academic staff regarding the performance standards emphasized by the professors during the presentation of the curriculum;

Students should treat each other with respect and foster an environment of honesty, ethical behavior and mutual respect.