# Storage and Packaging Technologies

**2022/2023 a.y.**

## Prof. Andrea Bassani

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

 The course aims to teach students about traditional and more innovative packaging materials, as well as the technologies for preserving and packaging agri-food products. The course will also cover current regulations governing the suitability of materials and objects for contact with food, as well as food product labelling.

 At the end of the course, students will have acquired the procedural and methodological knowledge for identifying the analytical operations to perform in order to verify compliance with the technological, qualitative and regulatory requirements of materials intended for contact with food. They will also possess adequate knowledge for evaluating the shelf-life of foods according to the characteristics and needs of the product, as well as the packaging material properties and preservation conditions.

The skills acquired will enable students to make and direct suitable choices for meeting the qualitative and functional requirements of food product packaging, so guaranteeing and improving product shelf-life, consumer safety and environmental sustainability.

***COURSE CONTENT***

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|  | ECTS |
| **Preservation and packaging** |  |
| Purposes and characteristics. Chemical and physical properties of packaging materials. Systematics of materials and objects for food packaging. Rigid and flexible packaging. Eco-friendly packaging | 1.5 |
| Preservation and packaging technologies. New-concept packaging materials and technologies. Innovations and problems.  | 0.5 |
| **Food shelf life**  |  |
| Definitions, problems, forecasting and simulation approaches, case studies | 1.5 |
| **Legislation** |  |
| Italian and EC regulations concerning materials in contact with food and labelling | 0.5 |
| **Tutorials** | 2 |
| Group work, numerical exercises on shelf life forecasting and evaluation, seminars with company testimonials |  |

***READING LIST***

G.L. Robertson, *“Food Packaging,* *Principles and Practices",* 2nd ed., CRC (Publ.), 2005.

D.S. Lee-K.L. Yam-L. Piergiovanni, *Food Packaging Science and Technology,* CRC Press, Inc., 2008.

L. Piergiovanni-S. Limbo, *Food Packaging. Materiali,* *Tecnologie e qualità degli alimenti*, Springer, 2010.

P. Calà-Sciullo, *Materiali destinati al contatto con gli alimenti,* Chiriotti Editori, Pinerolo (To), 2006.

Lecturer's notes.

Aids related to specific topics will be provided during the course.

***TEACHING METHOD***

1. Theoretical frontal and dialogue-based lectures aimed at presenting the key concepts of the subject.

2. Frontal tutorials involving the assisted solving of numerical problems related to calculation and prediction of food products shelf-life.

3. Assignment of working groups for the resolution of specific case-studies related to the course topics.

4. Classroom seminars with company testimonials.

5. A possible educational visit to a food packaging company.

***ASSESSMENT METHOD AND CRITERIA***

There will be a final written exam followed by possible oral discussion. Students will be given 2 hours to solve numerical exercises and answer theoretical questions. On average, 2-3 exercises on shelf-life evaluation will be given (maximum 15 marks), 2 open-ended questions (maximum 15 marks) and a close-ended question to reach “cum Laude” mark. In case of no answer or resolution, no marks will be awarded, while incorrect answers and errors in carrying out the exercises may result in penalties. The open-ended questions will also assess the student's appropriate use of the specific technical terminology used during the course. At the beginning of the course, it will be indicated if group work will be carried out during the year, with an illustration of the topics and aims of the work, and the requirements of the final report (PowerPoint presentation). In this case, the final mark will consider both the written exam and the group work assessment. Normally, the group work involves a literature research on specific topics covered in the course or resolution of assigned case-studies. The work groups may consist indicatively of a maximum of 5 students, and the contribution and role of each individual member must be explicitly indicated in the final report. The final report will be assessed with a mark out of 30. In the case of group work, the final mark will be taken as a weighted arithmetic mean of the mark obtained in the written test (with a 2/3 weight) and that obtained in the group work assessment (with a 1/3 weight). In the case of working students or students unable to participate in the group work, this must be communicated to the lecturer at the beginning of the course, who will then be able to provide appropriate alternative ways to cover this part of the programme.

***NOTES AND PREREQUISITES***

The course requires some basic knowledge of reaction kinetics, and the chemical-physical characteristics of food products.

In case the current Covid-19 health emergency does not allow frontal teaching, remote teaching will be carried out through synchronous or asynchronous procedures that will be promptly notified to students

***OFFICE HOURS FOR STUDENTS***

Prof. Andrea Bassani is available for the students after the lectures. In addition, he is available to receive students following specific appointment or through remote meetings. In any case, it is suggested to write an e-mail (andrea.bassani@unicatt.it) in order to agree on the day and time of reception.