Syllabus
Course description

Course title	**Chemometric approaches to study the chemical and sensory markers of food processing**
Course code	46027
Scientific sector	AGR/15-Food Science and Technology
Degree	PhD in Food Engineering and Biotechnology; Master Degree in Food Sciences for Innovation and Authenticity
Semester	1
Year	1
Academic year	2022/2023
Credits	3
Modular	NO

Total lecturing hours	20
Total lab hours	0
Total exercise hours	10
Attendance	-
Prerequisites	Basic knowledge of food chemistry and statistical analysis.
Course page	Dedicate page on OLE for A.A. 2021-2022, I semester The material used in the Course will be provided to the students on Teams (course page) upon enrollment.

Specific educational objectives	A) provide an adequate knowledge and a critical approach to the identification of chemical and sensory markers of food processing, packaging and authenticity. B) provide adequate knowledge of the most common multivariate statistical approaches used to study the influence of processing conditions on the composition of food products, with practical examples.

Lecturer	Dr. Edoardo Longo, office: NOITechpark, A2.3.03b, via A. Volta 13, 39100 Bolzano. E-mail: edoardo.longo@unibz.it, office phone: +39-0471017691, https://www.unibz.it/it/faculties/sciencetechnology/academic-staff/person/35783-edoardo-longo
Scientific sector of the lecturer	AGR/15 Food Science and Technology
Teaching language	English
Office hours	Scheduled as indicated the course timetable. Full availability to any request for more clarifications is granted upon previous arranged appointment.
Teaching assistant *(if any)*	None
Office hours	9
List of topics covered	***Theoretical part***

	Part A) Introduction to and application of exploratory multivariate statistics (e.g., PCA, HCA) in food quality data analysis; introduction to more advanced exploratory models (MFA, MCA); intro to methods used in sensory sciences and consumer tests (CATA, RATA); Part B) Supervised multivariate classification models (eg. SIMCA; LDA and QDA); Part C) Multiple and multivariate regression models (MLR, PCR, PLS), and derived classification methods (PLS-DA). **Practical activities** Training and use of software tools for multivariate statistical analysis, for applications to dataset from food analytical and sensory analysis.
Teaching format	Frontal lectures, exercises, projects

Learning outcomes	*Knowledge and understanding.* (a) adequate knowledge and understanding of the application of appropriate statistical tools for studying the chemical and sensory markers of food products quality and authenticity; (b) autonomous ability of devising and applying statistical strategies to investigate the chemical and sensory markers of quality and authenticity of food products; *Applying knowledge and understanding.* (a) developing the capability of integrating information, both in horizontal way (technological, chemical, biological, and regulatory aspects related to the chemical and sensory analysis of food products) and in vertical way (reasonable sequence of processes affecting the composition of food products for the evaluation of their quality and authenticity); *Making judgements.* Capability of identify critical parameters in order to improve the efficiency of the chemical and sensory analysis of food products; *Communication skills.* Capability of clearly and exhaustively communicate notions, ideas, problems and technical solutions by interpreting and integrating the results of chemical and sensory analyses of food products to interlocutors, either professional or not, representative of the various and specific competencies in the food supply chain (agronomist, engineers, biologists, chemists, nutritionists, administrators) *Learning skills.* Ability to achieve independence in the evaluation of statistical tools for the analysis of chemical and sensory data from food products, with an appropriate level of autonomy in the interpretation of results.

Assessment	A project work developed by the student will be assessed: presentation and discussion of a topic related to the contents of the course agreed between lecturer and students; the final mark is attributed in thirties.
Assessment language	English
Evaluation criteria and criteria for awarding marks	Successful completion of the examination will lead to grades ranging from 18 to 30 with honors.

Relevant for the final exam: clarity of the presentation, mastery of language, ability to summarize, evaluate, and establish relationships between topics; relevant for project work: ability to work in a team, creativity, skills in critical thinking, ability to summarize in own words |

Required readings	Keynotes and scientific publications provided by the lecturer. Some material is also available on Teams (course page) upon enrollment.
Suggested readings	"Chemometrics in Food Chemistry" (ed. Federico Marini); "Chemometrics with R" (ed. Springer); "Introduction to Multivariate Statistical Analysis in Chemometrics" (ed. CRC Press); other specific learning material will be proposed during the course.