Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Evaluation of Food Quality and Authenticity
Code der Lehrveranstaltung	44765
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	AGRI-07/A
Sprache	Englisch
Studiengang	Master in Lebensmittelwissenschaften für Innovation und Authentizität
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Dr. Ksenia Morozova, Ksenia.Morozova@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/34748
Wissensch. Mitarbeiter/Mitarbeiterin	Dott. Lorenzo Lovatti
Semester	Erstes Semester
Studienjahr/e	1st
KP	6
Vorlesungsstunden	36
Laboratoriumsstunden	24
Stunden für individuelles Studium	90
Vorgesehene Sprechzeiten	18
Inhaltsangabe	1. Introduction to Food Quality and Authenticity • Definitions and importance 2. Food Adulteration and Fraud Detection • Types and examples of adulteration • Impact on food quality and consumers • Analytical methods for detection and prevention

	3. Sensory Evaluation Techniques • Role of human senses in food assessment • Sensory methods and applications 4. Chemical Analysis for Food Evaluation • Detection of additives, contaminants, and key components • Laboratory techniques in food chemistry 5. Emerging Technologies in Food Authentication • Advanced instrumental techniques (e.g., NMR, MS, isotopic analysis) • Electronic sensing systems (e-nose, e-tongue) • Non-destructive methods (e.g., hyperspectral imaging)
Themen der Lehrveranstaltung	These five main topics provide an introductory understanding of the course's core concepts and emphasize the importance of evaluating food quality and authenticity using sensory, chemical, and technological approaches. 1. Food Quality and Authenticity: Basic Definitions Food quality refers to the characteristics and attributes of a food product that make it suitable for consumption. Food authenticity refers to the genuineness and integrity of a food product, ensuring that it is accurately labeled and free from adulteration or fraud. These concepts are critical for consumer trust and safety in the food industry. 2. Food Adulteration and Fraud Detection Food adulteration refers to the intentional addition of secondary or fraudulent substances to food products for economic gain. This topic covers the identification and detection of common food adulterants, the impact of adulteration on food quality and consumer appreciation, and analytical methods for detecting and preventing food fraud cases. 3. Sensory Evaluation Techniques Sensory evaluation techniques involve the systematic assessment of food products by human senses, such as taste, smell, touch, sight, and hearing. These techniques are used to measure and describe the sensory attributes of food, providing valuable insights into consumer preferences and perceptions. 4. Chemical Analysis for Food Evaluation Chemical analysis in food evaluation encompasses a wide range of laboratory techniques used to determine the chemical composition of food products. This includes nutritional analysis, identification of additives and contaminants, and quantification of key components

	such as vitamins, minerals, and flavor compounds. 5. Emerging Technologies in Food Authentication Emerging technologies in food authentication encompass innovative methods and tools used to verify the authenticity of food products. This includes nuclear magnetic resonance, mass spectrometry, isotopic analysis for origin verification, electronic noses and tongues for rapid sensory profiling, and hyperspectral imaging for non-destructive quality assessment.
Stichwörter	Food quality, food authenticity, food fraud detection, food analysis, advanced analytical techniques
Empfohlene Voraussetzungen	It is advisable for students to have a foundational understanding of food science principles, including food chemistry and food processing. A basic understanding of chemistry is often necessary, as the course may involve chemical analysis techniques for food quality assessment.
Propädeutische Lehrveranstaltungen	None
Unterrichtsform	The course combines lectures, practical exercises, laboratory sessions, and project-based learning.
Anwesenheitspflicht	No
Spezifische Bildungsziele und erwartete Lernergebnisse	Knowledge of analytical methods for determining the authenticity, functionality, and microbiological safety of food products, as well as the related methodological tools for risk assessment. These knowledge areas will be developed through an educational program that integrates theoretical teaching activities with classroom tutorials, including examples, practical applications, individual and group work, and assessments aimed at encouraging active participation and independent solution development. These knowledge areas will be developed through an educational program that integrates theoretical teaching activities with practical activities, such as laboratory exercises, computer simulations, simulations of food processes using pilot plants, and company visits. Ability to select and manage operations related to the traceability, authenticity, and microbiological safety of ingredients, semi-finished products, and food products, including quality assurance systems and product and process certification. Ability to plan and develop analytical techniques, innovative

	products, and processes using a multidisciplinary approach, with particular attention to local food productions. Independent judgement is developed through a training programme designed to stimulate critical analysis in students. This includes the use of case studies, simulations using spreadsheets and videos, the reading and critical discussion of scientific articles, as well as specialist seminars held by experts in the food sector. The assessment of the independent judgement acquired by students is entrusted to the individual teachers responsible for the training activities, who will assess it through oral and/or written reports on specific topics and/or through exams. Use of the English language, both written and spoken, at a B2 level, with a command of technical and scientific vocabulary related to food science. Structure and draft scientific and technical documentation describing project activities. Prepare and present technical reports in English on specialist topics; The degree course provides graduates with the cognitive skills, logical tools and familiarity with new information technologies necessary to ensure continuous updating of knowledge, both in their specific professional field and in the field of scientific research.
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	The course aims to provide students with advanced knowledge of the principles and analytical techniques used to evaluate food quality, authenticity, and integrity. Particular attention is given to chemical and sensory analysis, food adulteration and fraud detection, quality control, and emerging technologies for food authentication, including nuclear magnetic resonance, mass spectrometry, isotopic analysis, electronic noses and tongues, and hyperspectral imaging. By the end of the course, students will be able to: -explain the concepts of food quality, authenticity, integrity, adulteration, and fraud, and their relevance to the food industry and consumer protection; -identify and describe the main analytical approaches used for food quality control and authenticity assessment; -select appropriate analytical methods for specific food-quality and

	authenticity problems; -apply selected chemical and instrumental methods during laboratory activities; -analyse and interpret experimental data and critically evaluate analytical results; -prepare clear and scientifically sound laboratory reports; -discuss case studies and communicate analytical findings concisely and accurately.
Art der Prüfung	The final grade is based on a written examination (70%) and laboratory reports (30%). The written examination includes multiple-choice questions, calculation problems based on classroom exercises, and open-ended questions covering the lecture content and laboratory activities. The written examinations assess students' knowledge and understanding of food quality and authenticity concepts, analytical methods, and their appropriate application to specific problems. They may include theoretical questions, interpretation of analytical data, and practical calculation exercises. The laboratory reports assess students' ability to process and interpret experimental results, critically evaluate data, draw scientifically supported conclusions, and present laboratory activities clearly and accurately.
Bewertungskriterien	The written mid-term and final examinations assess: -knowledge and understanding of the main concepts of food quality, authenticity, adulteration, and food fraud; -knowledge of the analytical methods used to evaluate food quality and authenticity; -ability to select appropriate analytical approaches for specific problems; -ability to interpret analytical data and critically evaluate results; -accuracy, clarity, and appropriate use of scientific terminology. The laboratory reports assess: -correct processing and presentation of experimental data; -interpretation and critical discussion of results; -ability to identify potential sources of error and methodological

	limitations; -formulation of scientifically supported conclusions; -clarity, completeness, and appropriate scientific structure of the reports.
Pflichtliteratur	Slide, spreadsheets and materials discussed during the lectures.
Weiterführende Literatur	• Wrolstad, Ronald E., et al. Handbook of food analytical chemistry: pigments, colorants, flavors, texture, and bioactive food components. John Wiley and Sons, Inc, 2005. • Nielsen, S. Suzanne, ed. Food analysis. New York: Springer, 2010. • Lees, Michèle, ed. Food authenticity and traceability. Elsevier, 2003. • Montet, Didier, and Ramesh C. Ray, eds. Food traceability and authenticity: Analytical techniques. CRC Press, 2017.
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Kein Hunger, Nachhaltiger Konsum und Produktion, Gesundheit und Wohlergehen