Syllabus

Course Description

Course Title	Food-human axis: the gut microbiome
Course Code	46029
Course Title Additional	
Scientific-Disciplinary Sector	AGRI-08/A
Language	English
Degree Course	PhD Programme in Food Engineering and Biotechnology
Other Degree Courses (Loaned)	
Lecturers	Dott. Ali Zein Alabiden Tlais, AliZeinAlabiden.Tlais@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/38700
Teaching Assistant	
Semester	Second semester
Course Year/s	1
CP	3
Teaching Hours	30
Lab Hours	0
Individual Study Hours	45
Planned Office Hours	9
Contents Summary	This course provides several examples, in term of case studies, of the effect of the diet and functional foods on the human gut microbiome. The course consists of one module of 30 hours of frontal lectures. The cases of studies regard the effect of the dietary I habits, including the Mediterranean diet, fibers, functional foods and other nutrients on the microbiota composition, functionality and metabolome. The course has the educational objective to address the students to manage with the general microbiology and in particular with the conditioning and monitoring of the human gut microbiota diversity

	and its repercussion on the human well-being.
Course Topics	The course will cover the following topics: Introduction to digestive system Introduction to the human gut microbiome/microbiota Approaches to study the gut microbiome The model system to study gut microbiota Food diet and bioactive compounds Fermented food In vitro and in vivo case studies (studying effect of food on gut gut microbiota) Probiotics
Keywords	Food; Digestion; Microbiota; Fermnetation; Probiotics
Recommended Prerequisites	Students should have basic knowledge of human biology, microbiology, biochemistry, and food science. A background in molecular biology or biotechnology would be advantageous but is not mandatory.
Propaedeutic Courses	
Teaching Format	The course consists of lectures where the topics are presented by the professor. Course topics are presented at the blackboard and using electronic slides. Teaching material and additional materials are provided by the Professor at the beginning of each lectures.
Mandatory Attendance	compulsary
Specific Educational Objectives and Learning Outcomes	1. Knowledge and understanding The course provides students with an in-depth understanding of the complex interactions between diet, the human host, and the gut microbiome. It covers fundamental concepts of the digestive system, gut microbial ecology, diversity, and functionality, as well as the mechanisms by which food components influence microbial composition and metabolism. Students will gain knowledge of host–microbe interactions, food-derived bioactive compounds, and microbial metabolites with physiological relevance, along with the role of the microbiome in health and disease. Emphasis is placed on state-of-the-art methodologies for microbiome research, including omics-based approaches and in vitro/in vivo models. 2. Applying knowledge and understanding Students will learn to critically apply their knowledge to real-world contexts, such as designing dietary interventions targeting the

	microbiome, interpreting microbiome data from scientific studies, and evaluating food innovations intended to modulate gut microbial function. Through case studies, they will develop the ability to integrate microbiological, nutritional, and physiological data to assess the impact of specific foods, processing methods, and bioactive compounds on the human gut microbiome. 3. Making judgements The course fosters the capacity to make informed, evidence-based evaluations regarding the role of the diets and microbiome in health and disease. Students will be trained to critically analyse research articles, assess the quality and limitations of experimental designs, and distinguish between scientifically validated knowledge and unsupported claims in the public discourse on microbiome-related nutrition. Ethical aspects of microbiome research and personalised nutrition will also be addressed. 4. Communication skills Students will develop the ability to effectively communicate complex scientific concepts related to food components, food fermentation, and gut microbiome. Communication training will focus on clarity, accuracy, and contextual relevance, supported by visual data presentation and synthesis of scientific findings in oral format. 5. Learning skills The course enhances autonomous learning abilities by engaging students in self-directed literature review, critical discussions, and oral-based assignments. Students will be encouraged to investigate more about microbiome research and integrate new knowledge into their professional practice.
Specific Educational Objectives and Learning Outcomes (additional info.)	n/a
Assessment	The assessment of the student preparation is through an oral exam. The oral assessment includes: (i) the presentation, by the students, of a scientific work related to the topics of the course, (ii) questions to assess the knowledge and understanding of the course topics, and (iii) questions designed to assess the ability to

	transfer these skills to case studies.
Evaluation Criteria	Students are asked to attend the oral exam. It is relevant for the exam to: master the specific language (also with respect to teaching language); prove the understanding of the topics and learning skills; evaluate and establish relationships between topics; grow specific skills in critical thinking. The exam mark will be assessed as follows: oral exam
Required Readings	Depending on the case studies, the professor provides the related scientific articles. The supply of the articles is done at the beginning of each lecture and corresponding to each case studies.
Supplementary Readings	n/a
Further Information	n/a
Sustainable Development Goals (SDGs)	Good health and well-being