

Course	ECTS	Learning outcomes Knowledge acquisition	Skills & competences
First year (term one and two) Food and Technology in Padua			
Food science and safety	3	- main components and operations of foods, their modifications and interactions during food processing and impact on food quality - fundamentals of food safety, ecology of foodborne microorganisms in different food matrices and main procedures applied in food analysis	- adaptability to different foods in the evaluation of microbiome composition
Nutrition and metabolic pathways: from cells to organs	3	- importance of nutrition to sustain human life and basic nutrition concepts - metabolic pathways of individual nutrients present in foods	- understanding regulation and coordination of metabolic cycles in different physiological and pathological conditions, independently evaluating the effects of nutrients on cellular functioning and physiological systems - learning ability in analysis and discussion of the relationship between nutrition and physiological responses referring to molecular

			mechanisms understanding regulation and coordination of metabolic cycles in different physiological and pathological conditions, independently evaluating the effects of nutrients on cellular functioning and physiological systems
Research methods in economics: understanding decision making and consumer behavior to promote healthy choices	8	- consumer behaviour models of decision-making, including information processing and preferences development towards food - selected quantitative marketing research techniques, statistical approaches and econometric modelling. Students - opportunity for the student to reflect on his/her own behaviour as a consumer when exposed to new consumer patterns and choices	- understanding how to apply qualitative and quantitative tools to design and structure marketing research in order to collect and analyze data on consumer behaviour - understanding how to gain insights about how actually consumers make choices regarding food products and identify choice determinants - understanding how decisions are taken and why behaviour does not conform to the rationality assumptions proposed by classical economic theories

Methodology for the hazard analysis in food-related jobs	3	- essentials of food storage test design. - essentials of food challenge test design. - essentials of an HACCP PLAN design.	- know how to generate an experimental design to determine the shelf life of a food - know how to generate an experimental design to develop a challenge test of the most relevant foodborne pathogens - know how to develop protocols for an HACCP plan in a food plant.
Genomics of nutrition	6	- fundamentals of genomics, evolution of polymorphisms in human populations related to genes involved in nutrition, deregulated metabolic and molecular pathways in human nutrition	- establishing how nutrients and food triggers molecular adaptations in cells that cause tissue dysfunction and disease onset - interpreting medical, pharmacological, pathological, molecular and cell biology research literature on mechanism of disease onset/progression
Human Nutrition: sustainability and multidisciplinary perspective	4	- nutrition as the result of a complex interaction including genes, environment and food - nutrition related diseases intended as a consequence of a	- ability to provide individual and population specific advices for prevention of major nutrition-related diseases. - understanding the rationale for the

		disequilibrium inside this complex interaction - the role of nutrients and non-nutrient compounds on the development and progression of chronic diseases in the transdisciplinary context of global food production and sustainability	development of dietary guidelines and nutrition policies in different countries - understanding the role of food availability and sustainability in the context of human nutrition
Nutrition related diseases	6	- knowledge of the main diseases related to lifestyle and nutrition in the transdisciplinary context of Network Medicine. - design of primary and secondary nutritional prevention tools for the individuals and the community.	- assess nutritional status at a clinical and epidemiological level. - discuss major nutrition-related diseases in a global systemic context. - apply nutrition models in primary and secondary prevention of nutrition-related diseases.
Ecology of food borned pathogens, food toxicology and antimicrobial resistans	4	- fundamentals of food safety, characteristics, and ecology of foodborne microorganisms in different food matrices - microbes in foods and notions of the endogenous mechanisms that regulate microbial multiplication	- ability to apply and adapt the fundamentals of risk analysis to the main microorganisms, which cause zoonoses that have in food the vehicle of transmission to humans - transversal skills and problem-solving skills and an integrated

		- nature and essence of microbial biofilms and basics of cell-to-cell transmission mechanisms - emergence and spread of antimicrobial resistances, mechanisms driving transfer, selection and dissemination	logical approach to make decisions regarding the health and hygiene safety of food - ability to establish whether a food can limit the growth of contaminating microorganisms, with particular attention to foodborne pathogens
Mechanisms of tissues diseases and how environmental clues alter organ function	6	- impact of nutrition on disease progression and connections between quality and quantity of nutrients with dysfunction of metabolic relevant and insulin sensitive organs - molecular and biochemical perturbations in cells causing organ dysfunction - the contribution of inflammatory response and hormonal alterations to disease progression and the relationship with diet	- ability to establish how nutrients and food trigger molecular adaptations in cells that cause tissue dysfunction and disease onset - ability to interpret medical, pharmacological, pathological, molecular and cell biology research literature on mechanism of disease onset/progression.

Sustainable resource-efficient food production and processing	5	- the potential and connections of different indicators for sustainability (e.g. carbon and water footprints...) - climate change in food security, and the role of food processes to increase resilience and reduce the impact	- ability to compare different process technological solutions, in the evaluation of food supply chains both from a management and social perspective considering also sustainability - ability to manage geographical information systems to represent the vulnerability conditions of food production under different geomorphologic and anthropogenic conditions
Metab-Contam-AI laboratory	12	- relationships existing between foods matrices and they foodborne pathogens - mode of action of plant bioactive compounds and implications for human health. - procedures applied to food analysis for food safety - hands-on on artificial intelligence and other digital tools applied to food processes	- understanding of the endogenous mechanisms that regulate microbial multiplication and the virulence of food pathogens - understanding how the plant bioactive compounds can be an essential asset in nutritional treatment of pathologies - capacity to plan a predictive challenge test of foodborne

			pathogens in various kinds of food - understanding the potential of AI and other digital tools in decision making processes
International Regulations for Food Safety, Certification and Trading	6	- acquire an in-depth understanding of international and European legal frameworks governing food safety, trade, and certification systems. - gain essential knowledge of the institutional, regulatory, and policy foundations of food law. - understand the interaction between international treaties, EU regulations, and private standards within the global food system. - explore how food law contributes to global trade governance and sustainability objectives. - analyse the role of food regulation in achieving the	- identify and analyse legal issues within the agri-food sector. - interpret and apply regulatory instruments, standards, and certification systems. - evaluate the impact of legal frameworks on food safety, international trade, and consumer information. - consult and apply relevant legal and policy sources, including EU legislation, case law, and international guidelines. - address real-world regulatory problems in food law, trade, and certification through critical and interdisciplinary reasoning.

		United Nations 2030 Agenda for Sustainable Development.	
Second year (term three) Path 1: Food Neuroscience in Lyon1			
Neural basis of cognition	6	- principles of cognitive neurosciences (including experimental design and statistical analysis), in the context of sensory perception, cognition, emotions, and about their integration for the purpose of evaluating consumer products	- ability to apply the combining knowledge and techniques derived from cognitive neurosciences and sensorial analysis
Project Management	6	- different fields of application of neurosciences in the field of the food industry (with the intervention of international professionals e.g. Nestlè, Sodebo, Valrhona, etc)	- adaptability to transform an industrial problem into a neuroscientific question that they will be fully equipped to answer through accurate methodical investigation and implementation -ability to construct a project, master the principal analytical tools (sensorial tests, questionnaires, physiological investigations ...) and the tools for treating collected data (statistical)

			-learning ability to different fields of application, and to carry on bibliographic research and to correctly manage references. -capability to communicate and write a report and to propose solutions
Psychophysiology of perception	6	- principles of cognitive neurosciences (including experimental design and statistical analysis), in the context of sensory perception, cognition, emotions, and about their integration for the purpose of evaluating consumer products	- learning ability to different fields of application, and to carry on bibliographic research and to correctly manage reference
Sensory Analysis and consumer studies	6	- processes that relate food sensory analysis. - knowledge and techniques derived from the sensory analysis domain (quantitative, qualitative, panels, etc)	- ability to construct a project, master the principal analytical tools (sensorial tests, questionnaires, physiological investigations ...) and the tools for treating collected data (statistical)
Business Applications	3	- new trends, techniques and innovations in food science and technology	- ability to reformulate a demand to understand company needs. - ability to work in a team in an

			interdisciplinary way and critical reasoning, to allow application of know-how in a professional situation - engagement in the insurance of the safety and regulatory compliance of food products. - ability to apply the best strategies to be noticed by recruiters
Data	3	- new techniques and methods for complex data analysis, involving large datasets including different kinds of data (psychophysiology, implicit and explicit evaluations)	- ability to construct a project, master the principal analytical tools (sensorial tests, questionnaires, physiological investigations ...) and the tools for treating collected data (statistical)
Second year (term three) Path 2: Food Dietetics at UAK			
Clinical pathophysiology	3	- understanding the physiological basis of health and disease	- understanding the physiology and pathophysiology of the human body, the digestion process, absorption and metabolism of nutrients, and the impact of lifestyle and proper nutrition and physical activity on human health.
Education and	3	- understanding the role of diets	- assess the importance of

nutrition consulting		and high-quality food products in maintaining human health and considering different elements of food and dietetics - the processes that relate food and dietetics	professional and ethical responsibility for proper planning of the daily diets of various population groups. -formulate recommendations on various aspects of nutrition /including the selection of products, culinary techniques/ in accordance with the applicable principles of proper nutrition.
Immunodietetics	3	- role of the gut microbiome in the development and proper functioning of the immune system. - role of proper nutrition prevention and treatment of various diseases. - role of nutrients in immune response.	- plan and perform quantitative or semi-quantitative analysis of antigen in biological material using antisera and antibodies -analysis of physiological activity of immunocompetent cells in immune processes - apply the principles of occupational health and safety and good practices in the research/analytical laboratory
Methodology of assessment of food and nutrition pattern	4	- understanding the role of diets and high-quality food products in maintaining human health and considering different elements of	- knowledge on the characteristics of chronic non-communicable diseases resulting from nutritional errors as well as symptoms and causes of

		food and dietetics. - analyze and interpret the results of advanced measurements used in the assessment of nutrition and/or nutritional status. - identify nutritional mistakes, indicate corrective and preventive actions in this area and properly select health and nutritional education methods.	disorders and pathological changes resulting from poor nutrition and/or nutritional status, as well as determinants of nutritional disorders.
Methodology of experiments 1	1	- develop an adequate experimental design and specific analytical techniques that ensure optimal experimental results	- ability to correctly plan and conduct a scientific experiment to explain the impact of nutrition on human health as well as demonstrate corrective actions. Use basic and advanced statistical methods to interpret results.
Nutrition during pregnancy, lactation and infants' nutrition	3	- understanding the nutrition and dietetics bases of the different stages of life. - knowing the current trends and recommendations for women's nutrition in the periconceptional period, pregnancy and	- ability to find the necessary scientific information on the impact of maternal nutrition on the health of the child, interpret it, and develop a synthetic analysis with correct documentation as well as communicate precisely, concisely

		breastfeeding, the scientific basis of the impact of the diet of pregnant women on the health of the child, and to identify food as a source of nutrients and bioactive ingredients.	and appropriately.
Planning and organisation of dietary nutrition - nutritional, technological and hygienic aspects	5	- understanding the role of diets and high-quality food products in maintaining human health and considering different elements of food and dietetics. - the processes that relate food and dietetics. - plan and product dishes depending on the type of the diet in dietary catering. Identify and analyze, using various methods and sources, factors affecting their quality and safety.	- understanding principles of planning and production of dishes depending on the type of the diet in dietary catering. - ability to assess biological, chemical and physical hazards in catering production and methods of their identification.
Natural and synthetic sweeteners	2	- physiology of taste perception, what type of sweeteners can be used by people as the sugar replacements and which can be used for food production; impact	- understanding aspects related to the physiology of taste perception, characteristics of sweeteners and application in food technology. - assess the suitability of a given

		of the sweeteners on human health. - role of proper nutrition prevention and treatment of various diseases.	sweetener for use it in various type of products and its impact on the consumer's health, conduct an analysis of selected sweeteners in food products.
Gluten-free products and their role in human nutrition and diet therapy	2	- role of proper nutrition prevention and treatment of various diseases. - role of nutrients in immune response. - typical and atypical symptoms of celiac disease and modern methods of diagnosing it, principles of composing a gluten-free diet and gluten-free cereal products, the role of plant materials in the production of gluten-free and special types of bread and methods of their production.	- develop and prepare flour mixtures for gluten-free dough and confectionery, work in a team during preparation and evaluation of baked goods, improve the nutritional value of gluten-free breads and baked goods by selecting and using other naturally gluten-free products.
Allergens in food	2	- role of proper nutrition prevention and treatment of various diseases. - role of nutrients in immune	- understanding the function of the immune system and mechanisms of allergic reactions, types of allergens in food, basic diagnostics in

		response. - function of the immune system and mechanisms of allergic reactions, types of allergens in food, basic diagnostics in allergology and laboratory methods of detecting allergens.	allergology and laboratory methods of detecting allergens. - ability to perform the experiment according to the manual and under the supervision of the teacher describe the experiment, present the results and interpret them, prepare the results in the form of a report.
Functional properties of bee products	2	- quality requirements for natural honeys intended to sell bee products, bioactive components found in bee products and their role in human nutrition, how to perform basic quality tests of honeys required by relevant legal acts and interpret the results obtained, and perform analyses of bioactive components in bee products.	- understanding quality requirements for natural honeys intended to sell bee products, bioactive components found in bee products and their role in human nutrition. - carry out basic quality tests of honeys required by relevant legal acts and interpret the results obtained, perform analyses of bioactive components in bee products.
Cereals and pseudocereals in	2	- biologically active ingredients contained in cereal and pseudocereal grains, use of cereal	- ability to use cereal raw materials to prepare bread with higher content of bioactive compounds,

dietetics		products in dietetics and for bread production. development trends in cereal processing technology and bakery, how to use cereal raw materials to prepare health-promoting bread.	propose cereal products and dietetic bread in prevention and treatment of some diseases, assess bread in terms of its impact on human health and propose solutions to improve its nutritional value.
Nutrigenetics	2	- modern techniques in diagnostic and analytical methods used in the nutrigenetics, physiology and pathophysiology of the human body, digestion, absorption and metabolism of nutrients. - new developments in food and nutrition science in order to upgrade specialist knowledge in the field of human nutrition and dietetics.	- understanding of modern techniques in diagnostic and analytical methods used in the field of human nutrition and dietetics, physiology and pathophysiology of the human body, digestion, absorption and metabolism of nutrients.
Seminar	2	- different topics related to food technology and nutrition.	- ability to prepare and present an oral presentation, prepare essay, formulate the purpose and scope of the presentation, search for literature from various sources, construct tables, charts and other graphic elements of the

			presentation in field of food technology and nutrition.
Second year (term three) Path 3: Food Nutrition at UGR			
Endocrine disruptors	3	- molecular mechanisms of endogenous estrogens and the possible action of toxic substances that mimic their effects	- ability to assess, control and manage food quality and safety
Introduction to experimental nutrition	3	- essential concepts in experimental nutrition using <i>in vitro</i> and <i>in vivo</i> methods	- aptitude to organise and design activities in the field of experimentation in human nutrition, with problem-solving attitude in the field of human nutrition
Nutritional epidemiology	3	- the way in which dietary patterns can influence the health of certain populations or the prevalence of certain disorders	- ability to use nutritional epidemiology to determine the food consumption and eating habits of a given population and predict the potential pathologies related to such lifestyle
Nutritional and physiological aspects of physical activity and sports	3	- physiological, nutritional and metabolic bases of the different stages of life and physical activity	- adaptability to implement different molecular techniques that are used in advanced nutrition studies and ability to implement new methodology applied to nutrient

			determination
Functional foods	3	- latest advances in nutrition and food, such as transgenic foods, functional foods and their design and regulation	- Providing legal, scientific and technical advice to the food industry and consumers
Nutrition and digestive system 1. digestion 2. absorption	3+3	- processes that relate food to nutrition, such as the digestion and absorption of nutrients	- Schematize the functionalism of the different organs of the digestive system
Oxidative stress and ageing	3	- how some lifestyle habits can influence oxidative stress in the body and the role of macro- and micronutrients in preventing it	- Calculate and establish healthy lifestyle and dietary guidelines for individuals and communities
Nutrition in the development, evolution and prevention of prevalent chronic pathologies	3	- how nutritional imbalances can condition the appearance of some pathologies such as diabetes, cancer, etc. - the interlink between nutrients and gene expression and the interaction with them with negative effects	- Calculate and establish healthy lifestyle and dietary guidelines for individuals and communities
Mediterranean	3	- relationship between the	- Calculate and establish healthy lifestyle and dietary guidelines for

diet and health		Mediterranean diet and health	individuals and communities
Nutritional therapy: allergies, intolerances and other eating disorders. Diets adapted to special situations	3	- how allergies, intolerances, and other food-related disorders can be treated using the diet and the importance of nutritional status for the treatment outcomes	- Calculate and establish healthy lifestyle and dietary guidelines for individuals and communities
Methodologies for the assessment of nutritional status	3	- importance of nutritional status assessment as an indicator of health status indicator, describing the analysis of food and nutrients, as well as the evaluation of body composition	- To evaluate the nutritional status of individuals and collectivities
Relevance and use of cell cultures in nutrition research	3	- necessary skills and abilities to develop cell culture techniques and proceed to the adaptation of such techniques to the formulation of different experimental designs oriented to conditions and specific lines of research in nutrition	- ability to design cell culture experimental designs and analytical tools that can be successfully used in nutrition research

Micronutrients and human health: scientific advances related to their preventive/therapeutic effects	3	- Understand the mechanisms that regulate intestinal absorption and bioavailability of minerals and vitamins as well as their dietary sources. - Assess the nutritional and metabolic importance of minerals and vitamins. - Manage dietary intake of these micronutrients and study diseases associated with their deficiency or toxicity.	- Identify factors that influence nutrition. - Plan, implement, and evaluate therapeutic diets. - Prepare students to write scientific articles focused on publishing the results of their supervised research.
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Second year (term four) Internship and Master Thesis in Lyon1 or UBC

Industrial internship + thesis Lyon 1	30	- recruitment procedures in the professional world - studying preliminary drafts and projects - designing and testing prototypes, new products and processes - constantly adapting to new technologies and different projects - analysing and summarising technical and organisational	- ability to organise and design activities in the field of experimentation in human nutrition, with problem-solving attitude in the field of human nutrition - ability to work in a team in an interdisciplinary way and critical reasoning, to allow application of know-how in a professional situation - ability to carry out a research,
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		information - project management - assessing compliance with health and safety, traceability, intellectual integrity and industrial property rules - mastering the design and development of new microbiological products and processes - mastering molecular biology techniques for studying microorganisms - mastering the basics of biochemistry, genetics and the physiology of microorganisms - mastering the applications of microbiology in the fields of health, the environment and agronomy - enhancing and improving existing biological products and processes using innovative methods	development or innovation project in microbiology, implement quality standards, or monitor production units - learning ability to different fields of application, and to carry on bibliographic research and to correctly manage references - ability to apply the best strategies to be noticed by recruiters
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Internship + thesis UBC	30	- new trends, techniques and innovations in food science and technology - new techniques and methods for complex data analysis, involving large datasets	- ability to reformulate a demand to understand company needs - ability to work in a team in an interdisciplinary way and critical reasoning, to allow application of know-how in a professional situation - ability to construct a project, master the principal analytical tools and the tools for treating collected data (statistical) - learning ability to different fields of application, and to carry on bibliographic research and to correctly manage reference - capability to communicate and write a report and to propose solutions
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