COURSE OF STUDY: *Master in Food Science and Technology, (LM70)*
ACADEMIC YEAR *2024-2025*
ACADEMIC SUBJECT*: Insects as food, 3 CFU - Optional teaching*

General information	
Year of the course	*2nd*
Academic calendar (starting and ending date)	1st semester, September 23 2024 - January 17th 2025
Credits (CFU/ECTS):	3
SSD	*General and applied entomology AGRI-05/A-AGR/11*
Language	*English/Italian*
Mode of attendance	*Non-compulsory. The course has a laboratory approach, and I suggest the presence for a much rich and embedding experience.*

Professor/ Lecturer	
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Virtual room	Teams IDEAS: Insects as food, Optional teaching. Teams code: ***aaflyel***
Office hours and modalities	Available every day on WA mobile phone channel

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
75	*20*	*10*	*45*
CFU/ETCS			
3	*2*	*1*	

Learning Objectives	Learning consists of the critical ability to discuss and practice the topic for risk reduction and improving the safe use of insects proposed for food. The candidate will be familiar with the insect tissues, organs and apparatuses of potential food use and their postembryonic development steps. The overall learning objective is the continuous improvement of food products in a qualitative and quality sense, ensuring sustainability and environmental friendliness in processing activities and incorporating available technological innovations.
Course prerequisites	Basic knowledge in General and Applied Biology

Teaching strategies	The course will be offered with the help of Keynote presentations, video clips, classroom and laboratory exercises, and reading of regulatory texts. The practices in case studies will take a considerable part of the teaching. All the material used for the lecture will be made available to the students at the course kick-off on TEAMS.

Expected learning outcomes in terms of	
Knowledge and understanding on:	○ The course will provide knowledge about the main insect species available as food. ○ Insects' tissues, organs, and apparatus recognition and gross quantification for the use of food. ○ Key points in insect postembryonic development for the use as food. ○ Key points in insect diets for the use as food. ○ Opportunities and problems faced by humans in their experience as entomophagous.
Applying knowledge and understanding on:	○ Knowledge of the main macro- and microscopic techniques for the identification of food insect's species ○ Ability to assess the quality and safety of insects proposed as semi-processed, processed and preserved matter for human consumption.
Soft skills	• *Making informed judgments and choices* ○ Autonomy of judgement in assessing the overall availability of food insects ○ Autonomy of judgement in assessing the overall quality of food insects ○ Autonomy in recognising the main alteration in food insects • *Communicating knowledge and understanding* ○ Ability to manage, show and share the insect as food by engaging listeners in favour of using insects in products or raw materials, developing the critical sense of the target audience and raising interest in the topic. • *Capacities to continue learning.* • Ability to teach the use and the sense of technical and cultural tools for the best and safest use of food insects.
Syllabus	
Content knowledge	• Application of the principles of Entomology to the identification and qualitative assessment of food insects. Technologies, techniques, materials and methods necessary for the investigation of food insects • Generalities on edible insects • Collection and first processing techniques • Evaluation of protein, fat, cuticle, and other minor components of the edible insect • Evaluation of conservation status and alterations • Identification from semi-transformed or dead marketed insects • Application for assessing insects and their semi-finished products or preparations proposed as food, discussion of the cases studied.
Texts and readings	• Minelli A. & Bologna M.A. Ed(s) (2023). Sistematica ed evoluzione degli esapodi, Liguori Editore, ISBN978-88-207-6988-8, 648 pp. • Bodenheimer F.S. (1951). Insects as Human Food a chapter of the ecology of man. Springer-Science+Business Media, B.Y. 352 pp. • Halloran A., Flore R., Vantomme P., Roos N. (2018). Edible Insects in Sustainable Food Systems. Springer International Publishing AG, 479 pp.

Notes, additional materials	Handouts of the course, yearly updated .pdf file
Repository	Teams IDEAS: Insects as food, Optional teaching. Teams code: ***aaflyel***

Assessment	
Assessment methods	The assessment interview will cover three teaching topics proposed by the lecturer from among those developed during the theoretical and theoretical-practical lectures in the classroom and laboratory. The candidate will present their knowledge using the terminology and language suggested during the classes or found on the notes or in the recommended texts. Each year, an intermediate examination is possible as a test on the topics developed by the date of the exemption. The test will be graded in thirtieths, and in the event of success (>17/30), the final oral test will cover the remaining teaching content, with references to the topics of the entire course. The exemption grade will be weighted with the last step. Assessments will be communicated via ESSE3.

Assessment criteria	• Knowledge and comprehension skills:
	  ○ Recognise the main insects that can be used as food and describe their salient features.
	• Applied knowledge and comprehension skills:
	  ○ Reconstruct the phenomena and conditions determining the state and possible alterations of insects used as food.
	• Autonomy of judgement:
	  ○ Devise reasonable activities to resolve the demands for semi-finished products from insects and whole insects in food preparations.
	• Communication skills:
	  ○ List, describe and structure the morphological, biological and physicochemical phenomena that predispose to the use of certain insects as food.
	• Learning skills:
	• Express analysis and synthesis in evaluating case studies chosen by species, type and stage of postembryonic development, and biological characteristics.

Final exam and grading criteria	Learning will be measured as the critical ability to discuss the subject for the direct use of insects as food or as components of preparations. The candidate should be able to recognise the favourable and unfavourable characteristics of the insects covered in the course. The pass mark (18/30) is achieved by extensively and in-depth discussing one of the three topics for at least 10'. The candidate who discusses the three topics with quality of presentation, argumentative ability, autonomy of judgement and integration between the topics will bring the maximum mark (30/30). The case of the highest marks and original discussion merits a 'Cum Laude' grade. The overall learning objective is to find in the candidate the intent to continuously improve food products prepared or added with insects, offer quality, sustainability and environmental friendliness of industrial activities, and incorporate the product innovations provided by insects. The examination for international students can be taken in English.
Further information	