Stampare su carta intestata del CdS

General information	
Academic subject	***Soil microbiota management improving agricultural systems***
Degree course	*Innovation Development in Agrifood Systems*
Academic Year	*2021-2022*
European Credit Transfer and Accumulation System (ECTS)	3
Language	*English*
Academic calendar (starting and ending date)	*October 18th 2021 - January 28th 2022*
Attendance	*No compulsory attendance*

Professor/ Lecturer	
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Virtual headquarters	
Tutoring (time and day)	From Monday to Friday (8:00 am – 6:00 pm) only by appointment

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Syllabus	
Learning Objectives	*Soil-plant-microbiota-based strategies for crop adaptation to global climate change and application of novel, reduced-environmental-impact technologies for crop management.*
Course prerequisites	*Knowledge of basic microbiology*
Contents	*1. Microbial diversity of soil and rhizosphere (0.5 ECTS, lectures).* *2. Arbuscular mycorrhizal fungi (0.5 ECTS, lectures).* *3. Symbiotic nitrogen-fixing bacteria (0.5 ECTS, lectures).* *4. Plant Growth Promoting (PGP) bacteria (0.5 ECTS, lectures).* *5. Applications of mycorrhizal fungi, nitrogen-fixing and PGP bacteria to improve crop productivity (1 ECTS, "hands on" classes).*
Books and bibliography	• *Giri Bhoopander, Varma Ajit. Soil Health. Springer International Publishing, 2020.* • *Bruno Biavati, Claudia Sorlini. Microbiologia agroambientale. Casa Editrice Ambrosiana, 2008.*
Additional materials	*Notes from lectures and "hands on" classes. Presentations (in pdf) provided by the teacher.*

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
75	*16*	*14*	*45*
ECTS			
3	*2*	*1*	
Teaching strategy			
	Lectures will be presented through Powerpoint slides. Powerpoint presentations, in pdf format, will be shared with students through a mailing list and/or will be available on a dedicated virtual class (created in Microsoft Teams). "Hands-on" classes will consist in the analysis and discussion of case studies. Projection of		

	educational videos is also included as supplementary teaching method. *Lectures and "hands-on" classes will be held in "blended learning" mode.*
Expected learning outcomes	
Knowledge and understanding on:	o Knowledge about microbial-based methods that promote crop productivity, while decreasing the use of chemical fertilizers o Knowledge about soil-plant-microbiota-based strategies for crop adaptation to semi-arid areas and for increasing the use efficiency of agricultural inputs
Applying knowledge and understanding on:	o Applying microbial-based methods that promote crop productivity, while decreasing the use of chemical fertilizers o Applying soil-plant-microbiota-based novel techniques for increasing the use efficiency of agricultural inputs, while coping with consequences of global climate change and soil depletion
Soft skills	• *Making informed judgments and choices about* o Sustainable and innovative technologies for crop management • *Communicating knowledge and understanding* o Ability to transfer to agricultural companies and farms soil-plant-microbiota-based strategies that increase the use efficiency of agricultural inputs and favour crop adaptation to consequences of climate change and soil depletion o Ability to popularize her/his knowledge to policy makers • *Capacities to continue learning* o Ability to increase personal knowledge about application of microbial inoculants to crop management

Assessment and feedback	
Methods of assessment	*The exam consists of an oral dissertation on the topics developed during the lectures and "hands-on" classes.* *Students attending at the lectures may have a middle-term preliminary exam, consisting of a written test, relative to the first part of the program, which will concur to the final evaluation and will be considered valid for one year.*
Evaluation criteria	• *Knowledge and understanding* o Diversity, roles, and interactions of soil and rhizosphere microbiota o Main traits and roles of mychorrizal fungi, nitrogen-fixing and plant-growth-promoting bacteria • *Applying knowledge and understanding* o Applying microbial-based methods that promote crop productivity, increase the use efficiency of agricultural inputs, decrease the use of chemical fertilizers in the frame of consequences of global climate change and soil depletion • *Autonomy of judgment* o The student can make informed judgments and choices about sustainable and innovative technologies for crop management. • *Communicating knowledge and understanding* o The student can communicate soil-plant-microbiota-based strategies that increase the use efficiency of agricultural inputs and favour crop adaptation to consequences of climate change and soil depletion to agricultural companies, farms and policy makers. • *Communication skills*

	o The student can communicate her/his knowledge using an appropriate and simple lexicon, which may be understood by academicians, personnel managing agricultural companies and farms and policy makers. • *Capacities to continue learning* o The student can autonomously increase her/his personal knowledge about application of microbial inoculants to crop management. In addition, she/he can usefully blend the knowledges learned during the course in "Soil microbiota management improving agricultural systems" with the knowledges from other courses.
Criteria for assessment and attribution of the final mark	*The method of assessment is detailed in the Academic Regulations for the Master of Science Degree in Innovation Development in Agrifood Systems (article 9).*
Additional information	