General Information	
Academic subject	**Diagnosis and Biotechnologies in Plant Pathology**
Degree course	**Master degree Plant Medicine (LM69)**
Curriculum	
ECTS credits	6
Compulsory attendance	No
Language	Italian

Subject teacher	Name Surname	Mail address	SSD
	Vito Nicola SAVINO	vitonicola.savino @uniba.it	AGR/12

ECTS credits details	Area		
Basic teaching activities	Plant Protection disciplines		

Class schedule	
Period	First semester
Year	Second year
Type of class	Lectures, 4 ECTS (32 hours) Laboratory and field classroom and workshops, 2 ECTS (28 hours)

Time management	
Hours	150
In-class study hours	60 (32 Lectures + 28 Lab & field cl.)
Out-of-class study hours	90

Academic calendar	
Class begins	2018 March 5
Class ends	2018 June 22

Syllabus	
Prerequisites/requirements	Basic knowledge on diagnosis of plant pathogens, plant pathology, casual agents of plant disease.
Expected learning outcomes	*Knowledge and understanding on:* - diagnostic approaches to study plant disease and identify the casual agent; - sanitation techniques and resistance strategies to disease; - technical approaches for the production, storage and use of plant propagating material genetically assessed and with improved sanitary status. *Applying knowledge and understanding* on: - detection, identification and characterization of plant pathogens; - sanitation to produce plant propagating material with improved sanitary status; - resistance strategies to plant pathogens. *Making informed judgments and choices:* - Ability to analyze the different diagnostic techniques and to apply them for the characterization of virus, bacteria, fungi, etc. to produce plants with an improved sanitary status. *Communicating knowledge and understanding* - Personal ability to communicate in oral form using technical Italian and English language, to participate to multidisciplinary working groups. *Capacities to continue learning*

	- on diagnostic and sanitation protocols, for plant pathogens and traditional and innovative pathogen resistance techniques. Expected learning outcomes, as knowledge and ability, are reported in the annex A of the Didactic Regulation of the course Plant Medicine (expressed by European Descriptors)
Contents	Diagnostic methods to detect and identify the causal agents of diseases; Sanitation techniques to produce healthy plants; Resistance to plant pathogens **Diagnosis in Plant pathology** SYMPTOMATOLOGY - factors that bias the symptoms (hosts, pathogens, environmental conditions); - symptoms observation in field (techniques of field surveys and sampling). BIOLOGICAL DIAGNOSIS study of transmission and induced alterations on several susceptible hosts by: - mechanical transmission; - indexing SEROLOGICAL DIAGNOSIS - antisera - Serological techniques MOLECULAR DIAGNOSIS - electrophoresis of the viral and viroid RNAs (dsRNA), - amplification of genomic regions (RT-PCR), real time PCR, LAMP. - detection of genomic regions portions with probes (molecular hybridization) - next generation sequencing ELECTRON MICROSCOPY - identification of the casual agent by means observations to the electron microscopy on preparations from infected samples; - ISEM Immuno sorbent electron microscopy; - DIP plant viruses researches on crude sap; - Decoration - viruses recognized by antisera. **Production of Primary sources:** - sanitary selection; - in vivo and in vitro termotherapy; - in vitro colture meristematic tips; - micrografting; - somatic embriogenesis; - cryotherapy **Pathogen Resistance:** - Quantitative and qualitative resistance; - Methods to transfer of resistance: ▪ traditional (breeding) ▪ advanced (GMOs)
Course program	
Bibliography	• Conti M., Gallitelli D., Lisa V., Lovisolo O., Martelli G.P., Ragozzino A., Rana G.L., Vovlas C., 1996. I principali virus delle piante ortive. Bayer. • Matta A., 199. Fondamenti di Patologia Vegetale. Patron Editore.

	• Giunchedi L., Conti M., Gallitelli D., Martelli G.P., 2007 - Elementi di Virologia Ve-getale. Ed. Piccin. • R.E.F. Matthews., Fundamentals of Plant Virology. Academic Press, Inc. • Plant Pathology, G.,N., Agrios. • Scientific papers in english • Powerpoint delle lezioni Powerpoint of the lectures
Notes	None
Teaching methods	Lectures will be presented through PC assisted tools (PowerPoint, Adobe Acrobat, etc.), slide projector and by laboratory training.
Assessment methods	Only the students enrolled in the academic year during which this module is provided, can have a midterm exam during the time of teaching. The result of it remains valid for the whole academic year and concurs to the final evaluation of the student (in proportion to the ECTS evaluated during the midterm exam). The exam, as well as the intermediary exam, consist of an oral test with questions related to the lectures and visits , such as reported in the Didactic Regulation in Plant Medicine (art.9) and in the syllabus (annex A). The evaluation of the student is based on criteria previously fixed such as reported in the Annex A of the Didactic Regulation of the Master Course in Plant Medicine For Foreign students the exam could be in English.
Evaluation criteria	• *Knowledge and understanding* o Evaluation of knowledge on diagnostic approaches to study plant disease and identify the casual agent; o Evaluation of knowledge on sanitation techniques and resistance strategies to plant disease. • *Applying knowledge and understanding* o evaluation of the ability to apply the different techniques to detect, identify and characterize plant pathogens (viruses, bacteria, fungi, etc.); o evaluation of the ability to apply the sanitation techniques to produce plant propagating material with improved sanitary status; o evaluation of the ability to apply the appropriate resistance strategy to a plant pathogen. • *Making informed judgments and choices* o evaluation of ability to analyze the different issues could be occurred to detect and identify a plant pathogen and to choose the appropriate technique. • *Communicating knowledge and understanding* o evaluation of the personal ability to communicate in oral form using technical language , to participate to multidisciplinary working groups. • *Capacities to continue learning* o evaluation of the ability to learn both diagnostic and sanitation protocols for plant pathogens and traditional and innovative resistance techniques.
Further information	**Visiting hours** Please, contact the teacher to the email address vitonicola.savino@uniba.it