General Information	
Academic subject	Agricultural acarology and nematology (Module of I.C. Agricultural
	acarology, nematology and weed management)
Degree course	Master course in Plant Medicine (LM69)
ECTS credits	6
Compulsory attendance	No
Language	Italian

Subject teacher	Name Surname	Mail address	SSD
	Enrico DE LILLO	enrico.delillo@uniba.it	AGR/11

ECTS credits details		
Basic teaching activities	Plant protection	
	disciplines	

Class schedule	
Period	First semester
Year	First 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 Laboratory)
Out-of-class study hours	90

Academic calendar	
Class begins	October 9, 2017
Class ends	Januray 26, 2018

Syllabus	
Prerequisites/requirements	General and applied biological and zoological knowledge
Syllabus Prerequisites/requirements Expected learning outcomes	General and applied biological and zoological knowledge         Knowledge and understanding <ul> <li>Knowledge and understanding of the morphological, taxonomical, biological, ethological and ecological aspects concerning phytophagous nematodes and mites, and their natural enemies</li> <li>Knowledge and understanding of the basic aspects of the integrated plant and product protection from phytophagous nematodes and mites, and the national and international related norms</li> </ul> <li>Applying knowledge and understanding</li> <li>Knowledge and understanding for the identification and characterization of phytophagous nematodes and mites, and their natural enemies, by means conventional and advanced methods and techniques, included biotechnologies</li> <li>Knowledge and understanding for the application of direct and indirect (on the basis of the symptoms) monitoring plans of phytophagous nematodes and mites</li> <li>Knowledge and understanding for planning and managing the IPM of the crops and their products from phytophagous nematodes and mites in order to improve the qualitative, quantitative and sanitary aspects of the products as well as their storing and marketing</li>
	• Ability of understanding biological, ethological and ecological
	phenomena which allow the success of these plant feeders

	<ul> <li>Ability of application of treatments able to limit the development of phytophagous nematodes and mites in the considered context</li> </ul>
	<ul> <li>Communicating knowledge and understanding</li> <li>Ability of description of phytophagous nematodes and mites, and the biological, ethological and ecological phenomena of these plant feeders in the considered context</li> </ul>
	<ul> <li>Capacities to continue learning         <ul> <li>Ability of updating the own knowledge on phytophagous nematodes and mites, and the biological, ethological and ecological phenomena involving these plant feeders in the considered context</li> </ul> </li> </ul>
	The results of the expected learning, in term of knowledge and ability, are listed in the Annex A of the Didactic Regulation of the Master Science Course in Plant Medicine (expressed by the European descriptors of the study title).
Contents	General nematology: morphology and anatomy, dimorphism; biology and behaviour, life history and reproductive strategies, biological strains, resistance stages, dispersion; population dynamics; effects of the abiotic and biotic factors; interactions between nematodes and their host plants; symptoms and injuries (morphological, biochemical and physiological alterations induced by nematodes on their host plants); relationships between plant nematodes; agronomic, physical, natural, biological and chemical control and its problems. Main plant nematodes: <i>Meloidogyne incognita</i> , <i>M. javanica</i> , <i>M. arenaria</i> , <i>M. hapla</i> , <i>M. naasi</i> , <i>Globodera rostochiensis</i> , <i>G. pallida</i> , <i>Heterodera schachtii</i> , <i>H. avenae</i> , <i>H. cacti</i> , <i>H. carotae</i> , <i>H. fici</i> , <i>H. goettingiana</i> , <i>Ditylenchus dipsaci</i> , <i>D. destructor</i> , <i>Aphelenchoides</i> <i>fragariae</i> , <i>A. ritzema-bosi</i> , <i>A. besseyi</i> , <i>Paratylenchus dianthus</i> , <i>Pratylenchus</i> spp., <i>Tylenchulus semipenetrans</i> , <i>Xiphinema index</i> , <i>X.</i> <i>diversicaudatum</i> , <i>X. italiae</i> . General acarology: morphology and anatomy, dimorphism and polimorphism, biology and behaviour, lyfe history and reproductive strategies, diapausa and quiescence, dispersion, trophic habit; mutualistic symbiosis; infochemicals; population dynamics; influence of biotic and abiotic factors; interactions between mites and their host plants; symptoms and injuries (morphological, biochemical and physiological alterations induced by nematodes on their host plants); defence mechanisms of plants against mites; agronomic, physical, biological and chemical control and its problems. Main phytophagous mites: Laelapidae ( <i>Hypoaspis aculeifer</i> ), Phytoseiidae ( <i>Phytoseiulus persimilis</i> , <i>Typhlodromus exhilaratus</i> ), Cheyletidae, Pyemotidae ( <i>Pyemotes tritici</i> , <i>P. ventricosus</i> ), Siteroptidae ( <i>Siteroptes</i> spp.), Pygmephoridae ( <i>Pediculaster mesembrinae</i> ), Tarsonemidae ( <i>Steneotarsonemus pallidus</i> , <i>Polyphagotarsonemus latus</i> ), Penthaleidae ( <i>Penthaleus major</i> ), Tydeidae, Tenuipalpidae, Petrahaleidae ( <i>Penthaleus major</i> ), Tydeidae, Tenuipalpid
	nematode and mite extraction; storing methods. Nematode and mite preparation for microscopical studies. Identification of nematodes, mites and the related symptoms. Rearing of some species. Efficacy indexes.

Course program	
Bibliography	Notes of the lectures
	<ul> <li>Study schemes:</li> <li>presentations and other didactic material provided during the lessons</li> </ul>
	<ul> <li>Additional readings:</li> <li>AA.VV., 2014 – Nematologia Agraria generale e applicate. SIN</li> <li>Bassetti B. Barbagallo S. Suss L. Trambleu F. 2000 - Manuala di</li> </ul>
	<ul> <li>Baccetti B., Barbagallo S., Suss L., Hemblay E., 2000 – Manuale ul Zoologia agraria. A. Delfino Ed., Roma.</li> <li>Evans G.O., 1992 - Principles of Acarology. CAB International</li> </ul>
	<ul> <li>Hoy M.A., 2011 - Agricultural Acarology: Introduction to Integrated Mite Management. CRC Press Inc, 430 pages</li> <li>Kraptz G.W., Walter D.E., 2009, A Manual of Acarology, Taxas Tash</li> </ul>
	<ul> <li>Kranz G.W., Water D.L., 2009 - A Manual of Acarology. Texas feel University Press</li> <li>Laffi F., Ponti I., 1997 - Acari dannosi alle piante. Schede</li> </ul>
	<ul> <li>fitopatologiche. Inf. Agr. ed.</li> <li>Pellizzari Scaltriti G., 2002 – Parassitologia animale dei vegetali.</li> </ul>
	<ul> <li>Perry R.N., Moens M., 2006 – Plant Nematology. CABI, Wallingford, UK</li> </ul>
	<ul> <li>Tacconi R., Ambrogioni L., 1995 - Nematodi da quarantena. Lo Scarabeo ed.</li> </ul>
	<ul> <li>Zhang ZQ., 2003 – Mites of greenhouses. Identification, biology and control. CABI Publishing, Wallingford, UK.</li> </ul>
Notes	Students could get a copy of all presentations utilized for lectures, including also those eventually needed for the practical activities, downloading them through the repository at the ATutor digital platform on the website <a href="http://tempus-it.agrif.bg.ac.rs/login.php">http://tempus-it.agrif.bg.ac.rs/login.php</a> .
	There is not a text in Italian language which treats all topics of the present discipline. Information can be fragmented or too specialistic on Italian and International Journals and books. Therefore, students are strongly invited to follow the lessons in order to have simplified and updated information
Teaching methods	The subjects are provided with several examples and illustrations by means of Power Point presentations, movies, practical drills in the classroom and laboratory
Assessment methods	Only the students enrolled in the academic year during which this module is offered, can have an intermediary exam during the teaching period of module. The result of this intermediary exam remains valid for the whole academic year and concurs to the final evaluation of the
	student.
	lessons and the practical activities as reported in the Didactic Regulation in Plant Medicine (art. 9) and syllabus (annex A) and which is correlated
	to the actual teaching period. The evaluation of the intermediary exam is expressed in thirtieths.
	At the end of the module teaching period, the students, who passed positively the intermediary exam, can give the final exam concerning on the subjects treated during the lessons and the practical activities since
	the intermediary exam, as reported in the Didactic Regulation in Plant Medicine (art. 9) and syllabus (annex A) and which is correlated to the actual teaching period.
	Students who did not pass or give the intermediary exam will be examined on the whole subjects treated during the lessons and the

	practical activities as reported in the Didactic Regulation in Plant Medicine (art. 9) and syllabus (annex A) and which is correlated to the actual teaching period. The intermediary and the final exams consist of an oral test. The evaluation of the student is based on criteria previously fixed such as reported in the Annex A of the Didactic Regulation in Plant Medicine. The exam for foreign students can be given in English according to the above reported modalities.
Evaluation criteria (Explain for each expected	Knowledge and comprehension ability
learning outcome what a student has to know,	<ul> <li>Description of the basic morphological, biological, ecological</li> </ul>
or is able to do, and how many levels of	and ethological characteristics of the phytophagous nematodes
achievement there are.	and mites, and their natural enemies
	<ul> <li>Description and evaluation of the basic aspects of the integrated plant and product protection from phytophagous nematodes and mites, and the national and international related norms</li> </ul>
	Knowledge and applied comprehension ability
	<ul> <li>identification phytophagous nematodes and mites, and their</li> </ul>
	natural enemies, also on the basis of the symproms
	<ul> <li>planning the monitoring of phytophagous nematodes and mites</li> <li>planning an integrated protection strategy of crop and products from phytophagous nematodes and mites in order to improve the qualitative, quantitative and sanitary aspects of the products, as well as their storing and marketing</li> </ul>
	Autonomy of judgement
	<ul> <li>formulation of potential treatments on the factors favouring the success of phytophagous nematodes and mites</li> </ul>
	<ul> <li>evaluation of the planning and corrective treatments able to limit the success of phytophagous nematodes and mites</li> </ul>
	Communication skills
	<ul> <li>exhaustive description and illustration, with appropriateness of terms, richness of examples and correlation of the basic aspects which favour the success of phytophagous nematodes and mites</li> </ul>
	Learning ability
	$\circ$ adaptation of the basic cognitive tools acquired during the
	module in order to explain and solve numerous applied problems and diversified case of study
Further information	Visiting hours
	Wednesday, Thursday and Friday from 11.30 am to 1.30 pm, after a
	request of appointment.