

Nematology: PLPA 5500/6500

FALL 2012

Instructor: Dr. Kathy Lawrence
227 Life Sciences
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Lecture: 10:00 AM - 10:50 AM MW **Room:** 114 Life Sciences
Lab: 11:00 AM - 12:50 AM MW

1) Credit Hours: 4

2) **Text and major resource materials:**

- Barker, K. R. , G. A. Pederson, and G. L. Windham. 1998. *Plant and Nematode Interactions*. Number 36, Agronomy series. American Society of Agronomy, Inc., Crops Science Society of America, Inc. and Soil Science Society of America, Inc. Madison. Wisconsin, USA.
- Mai, William F. and Peter G. Mullin with Howard H. Lyon and Kent Loeffler. 1996. *Plant-Parasitic Nematodes A pictorial Key to Genera*. (5th ed). Comstock Publishing Associates of Cornell University Press, Ithaca, USA.
- Dropkin, Victor H. 1980. *Introduction to Plant Nematology*. John Wiley & Sons, New York, USA

Course Rationale:

In this an undergraduate/graduate level course, that will broaden your knowledge about nematodes. This is a comprehensive survey of plant-parasitic nematode, their evolution, morphology and ontogeny of reproductive structures will be discussed. Consideration will be given to their physiology and role as plant pathogens.

3) Course Description:

PLPA 5500/6500 Plant Nematology (4) Lec. 2 Lab 4. Pr., BIOL 1030. Presentation of nematodes in relation to plant diseases, identification of plant nematodes; nature of pathogenicity; principles and practices of management; recent advances in phytonematology. Fall even years.

4) Course Objectives:

- 1) To gain a basic understanding of all types of nematodes and their importance in the environment and as animal, human, and plant parasites.
- 2) To gain knowledge on morphology and identification of plant nematodes.
- 3) To learn the management systems for plant parasitic nematodes.

5) Course Content:

The course will cover the general basis of nematode biology, systematics, and ecology. Specific information on the most important crop-nematode interactions will be discussed. Students are required to do the assigned readings from the textbook and supplemental books and refereed papers. Videos, handouts with images will also be presented.

Course Topics:

The topics in this course provide a thorough knowledge of the following:

Unit - 1:

Topics to be covered

Week 01 – Introduction to Nematology

Week 02-- Nematode extraction from soil and roots, extraction efficiency.

Week 03 – Morphology and Systematics

Week 04 -- Soil type, soil properties; anabiosis.

Week 05 -- Population dynamics, exponential growth, logistic growth.

Week 06 -- Resistance and tolerance; antagonistic plants.

Week 07 -- Thresholds and integrated pest management.

Week 08 -- Soil food webs, nematodes and other soil organisms. Midterm test

Unit - 2:

Week 09 -- Biological control, natural enemies of nematodes; nematode- disease interactions.

Week 10 -- Biodiversity, nematode community structure; bioindicators, maturity index;

Week 11 -- Energy, biomass, respiration, production;

Week 12 -- Mulches and organic amendments; solarization.

Week 13 -- Cropping systems, cover crops, crop rotation;

Week 14 -- Nematode management by nematicides; environmental fate of nematicides; conservation tillage

Week 15 – Future outlook; sustainability and nematode management;

Week 16 – Final exam

The lab assignments in this course provide thorough hands on experience of the following:

1. Introduction – use of the microscope and nematode preservation.
2. How to take a nematode sample
3. General classification schemes for plant parasitic nematodes.
4. *Meloidogyne* spp – Root knot nematodes
5. *Rotylenchulus reniformis* – Reniform nematode
6. *Heterodera glycines* – Soybean cyst nematode
7. *Hoplolaimus* spp. – Lance nematode
8. *Pratylenchulus* spp. – Lesion nematode
9. *Mesocriconema* spp. – **Ring nematode**
10. *Helicotylenchus* spp. – Spiral nematode
11. *Paratrichodorus* spp. – Stubby Root nematode
12. *Tylenchorhynchus* spp. – Stunt nematode
13. *Belonolaimus* spp. – Sting nematode
14. Free living nematodes
15. Lab practical

6) Course Requirements:

1. Lecture Presentations:

Lectures will be in the form of power point presentations with questions intermingled throughout the lecture. Presentations will include all the information about each nematode as well as color photos of the nematode life stages and structures. Questions will be asked frequently to stimulate student understanding and retention.

2. Lab Assignments:

The students will be required to build a lab notebook containing all the information they will need in the labs for the entire semester. Successful learning in lab will require active participation by the students. The diversity of experiences with the lab assignments between the students will enhance the learning and bring a different perspective to the course. Students will be required to summarize their experiences from each lab in the form of weekly lab reports. These reports will be turned in on Thursday evening by midnight. Reports may be submitted by email or hard copies may be placed in my mail box outside 209 Life Science.

3. Nematode collection:

To truly learn nematodes you must make a collection of your own. The collection will be turned in with each exam keeping classifications in order.

Due Date	<u>Undergraduate</u>	<u>Graduate</u>
Mid term	1 Aphelenchida 1 Tylenchida 1 Dorylaimida	2 Aphelenchida 2 Tylenchida 2 Dorylaimida
Final exam	3 plant parasitic nematodes Identificc to genus	6 plant parasitic nematodes Identificc to genus

4. Oral presentation and paper: Graduate students will be required to prepare a PPT presentation on the plant parasitic nematode pests of a crop. Crops will be assigned by the professor. The presentation will be summarized in a 5-7 page paper with references.

5. Exams:

Throughout the semester, students will be given two exams, a mid term and a final, based on the lectures, laboratory materials and readings. Exams will be an essay form.

6. Final Examination:

The final exam will be comprehensive and will be based on the material presented in lecture and lab.

Performance Evaluation:

The work in this course will be evaluated on the basis of the responses to exams, lab reports, the final exam, nematode collection and nematode presentations and papers. The final course average will be computed as follows although points may vary.

Lecture and Laboratory:

	Undergraduate	Graduate
Mid Term	100 points	100 points
Final Exam	100 points	100 points
Lab reports (approximately)	130 points	130 points

Lab practical	50 points	50 points
Nematode collection (approximately)	60 points	120 points
Oral presentation and paper		100 points
Total points	440 points	600 points

Grading System: There will be approximately 500 points. Letter grades will be based on percentages.

A =	90% - 100%	>450	points
B =	80% - 89%	>400 – 449	points
C =	70% - 79%	>350 - 399	points
D =	60% - 69%	>250 – 299	points
F =	0 - 59%	<249	points

POLICY STATEMENTS

Attendance: Although attendance is not required, students are expected to attend all classes, and will be held responsible for any content covered in the event of an absence.

Excused Absences: Students are granted excused absences from class for the following reasons: illness of the student or serious illness of a member of the student's immediate family, the death of a member of the student's immediate family, trips for student organizations sponsored by an academic unit, trips for university classes, trips for participation in intercollegiate athletic events, subpoena for a court appearance, and religious holidays. Students who wish to have an excused absence from class for any other reason must contact the instructor in advance of the absence to request permission. The instructor will weigh the merits of the request, and render a decision. When feasible, the student must notify the instructor prior to the occurrence of any excused absences, but in no case shall such notification occur more than one week after the absence. Appropriate documentation for all excused absences is required. Please consult the Student Policy eHandbook for more information on excused absences.

Make-Up Policy: Arrangement to make up a missed major examination (e.g.:hour exams, mid-term exams) due to properly authorized excused absences must be initiated by the student within one week of the end of the period of the excused absence(s). Except in unusual circumstances, such as the continued absence of the student or the advent of university holidays, a make-up exam will take place within two weeks of the date that the student initiates arrangements for it. Except in extraordinary circumstances, no make-up exams will be arranged during the last three days before the final exam period begins.

Academic Honesty Policy: All portions of the Auburn University student academic honesty code (Title XII) found in the Student Policy eHandbook will apply to university courses. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

Disability Accommodations: Students who need accommodations are asked to electronically submit their approved accommodations through AU Access and to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternate time can be arranged. To set up this meeting, please contact me by e-mail. If you have not established accommodations through the Office of Accessibility, but need accommodations, make an appointment with the Office of Accessibility, 1228 Haley Center, 844-2096 (V/TT)