

NEMATODE MORPHOLOGY AND ANATOMY

NEM 6101L (LAB) 2 CREDIT HOURS

LOCATION: Room 2218, Department of Entomology and Nematology, Bldg. 970

TIME: Wednesdays 10:40 – 12:35 (Period 4-5). Although official lab time is limited to 2 hours, plan on additional 3-5 hours /week of lab work in either the instructor's or your own lab.

FALL

INSTRUCTOR: Dorota Porazinska
Room 2210, Department of Entomology and Nematology, Bld. 970
email: dorotalp@ufl.edu (but please communicate via Canvas email)

OFFICE HOURS: Tuesdays 12:35 – 2:35 PM or arrange a meeting.

“In short, if all the matter in the universe except the nematodes were swept away, our world would still be dimly recognizable, and if, as disembodied spirits, we could then investigate it, we should find its mountains, hills, vales, rivers, lakes, and oceans represented by a film of nematodes. The location of towns would be decipherable, since for every massing of human beings there would be a corresponding massing of certain nematodes. Trees would still stand in ghostly rows representing our streets and highways. The location of the various plants and animals would still be decipherable, and, had we sufficient knowledge, in many cases even their species could be determined by an examination of their erstwhile nematode parasites.

We must therefore conceive of nematodes and their eggs as almost omnipresent, as being carried by the wind and by flying birds and running animals; as floating from place to place in nearly all the waters of the earth; and as shipped from point to point throughout the civilized world in vehicles of traffic.” (*N. A. Cobb, 1915*)

COURSE DESCRIPTION: The course provides advanced knowledge on morphology and anatomy of free-living, plant-parasitic, and animal-parasitic nematodes. It covers detailed morphological structures and anatomical systems in the context of their physiological and ecological functions as well as systematics, classification, and identification.

COURSE GOALS AND/OR OBJECTIVES: By the end of this course, students will:

1. Prepare temporary and permanent slides illustrating morphological and anatomical features of nematodes.
2. Observe, draw, and describe morphological and anatomical features used in nematode classification.

3. Identify features to infer about their evolutionary placement
4. Diagnose common nematode taxa.
5. Practice light and digital microscopy to develop skills relevant to nematode systematics and diagnostics.

REQUIRED PAPER READINGS (see schedule for dates):

De Ley, P. 1995. A resource for nematode phylogeny.
Yeates, G.W., Bongers, T.D., De Goede, R.G.M., Freckman, D.W. and Georgieva, S.S., 1993. Feeding habits in soil nematode families and genera—an outline for soil ecologists. *Journal of nematology*, 25(3), p.315.

ADDITIONAL RESOURCES:

Introduction to Nematology. Chitwood and Chitwood. 1974.
The Biology of Nematodes, Lee, D. 2002.

PREREQUISITE KNOWLEDGE AND SKILLS: Students can take the NEM 6101L only if NEM 6101 is being taken concomitantly or has been taken in the past. In addition, your curiosity, excitement about learning, and appreciation for diversity will take you a long way!

PURPOSE OF COURSE: To establish a strong foundation of basic knowledge of nematode morphology, anatomy, and physiology that informs about nematode feeding habits, their taxonomic diversity, and potential habitats and functioning.

INSTRUCTIONAL METHODS: This course will consist of labs and hands-on activities.

Labs will involve work with microscopes and actual observations of the features on living specimens (or sometimes fixed specimens) on slides. As part of the lab requirement, students will routinely prepare temporary slides during ongoing lab sessions and record observations from them in the form of drawings/images and detailed notes. In addition, students will prepare a slide collection consisting of 10 permanent slides that demonstrate at least 10 morphological features encountered throughout the class. Occasionally, students will be required to watch instructional videos, and read and discuss a scientific article. For details see below.

GRADING POLICIES:

Assignment	% of Final Grade
8 Lab Assignments (160 pts)	40%

High-resolution Image Collection (160 pts)	40%
4 Videos/Readings/Discussions (160 pts)	20%

Lab assignments: Labs rely primarily on temporary, made in-class from living specimens slides and sometimes on permanent slides provided by the instructor. Lab assignments generally include: 1. making temporary slides, 2. observing nematode features under a microscope, 3. drawing/taking images, and 4. annotating drawings/images for morphological features. Students are required to make on average 3 temporary slides for each of the lab activities. To make temporary slides, students use dissecting scopes and living material to demonstrate their ability to pick and mount nematodes for compound microscope observations and drawings/images. Images need to be uploaded to the Nematode Anatomy and Morphology Teams channel. Digital microscope will be used to recover more detailed high-resolution images. Assignments are due a week later (Wednesday at 9:00 AM) prior to the following lab activity. Students are encouraged to use provided rubrics to ensure they receive maximum scores.

Image Collection: Students must demonstrate high resolution images of at least 10 morphological features encountered throughout the class. These 10 different features cannot be limited to just e.g., cuticular markings or a single nematode species but rather reflect the breath of the studied material throughout the course (i.e., 10 different taxa illustrating 10 different morphological features). Images need to be annotated for the specific features. Specimens may come from any unmounted source, but there is a field trip scheduled to collect fresh materials. Grading rubrics are provided ahead of time. High resolution images can be accomplished in Room 2220 on a digital Keyance microscope, but students can make their own arrangements.

Reading and discussion: Student are required to read suggested literature to discuss and accomplish specific activities. Again, grading rubrics for discussions are provided.

GRADING SCALE (%):

100 – 94	A
<94 – 90	A-
<90 – 87	B+
<87 – 84	B
<84 – 80	B-
<80 – 77	C+
<77 – 74	C

<74 – 70	C-
<70 – 67	D+
<67 – 64	D
<64 – 60	D-
<60	E

COURSE SCHEDULE:

Lab Schedule (tentative), Wednesday 10:40 – 12:35 (Period 4-5), Room 2218 ENY

Lab	Week	Topic	Assignment
1	08/21/24	Microscopy: dissecting, compound, inverted, digital	<ol style="list-style-type: none"> 1. Become proficient with microscopes 2. Pick nematodes 3. Make temporary slides 4. Read De Ley 1995
2	08/28/24	Nematode sampling and extracting	<ol style="list-style-type: none"> 1. Collect soil samples 2. Review extraction methods 3. Read De Ley 1995
3	09/04/24	Cuticular markings	<ol style="list-style-type: none"> 1. Makes temporary slides 2. Observe and record
4	09/11/24	Cuticle, hypodermis, and muscles	<ol style="list-style-type: none"> 1. Make temporary slides to test permeability 2. Use permanent slides 3. Observe and record
5	09/18/24	The art of permanent slides	<ol style="list-style-type: none"> 1. Read De Ley 1995
6	09/25/24	Digital microscope	<ol style="list-style-type: none"> 1. Take high-resolution images
7	10/02/24	High quality temporary slides	<ol style="list-style-type: none"> 1. Work on Image collection
8	10/16/24	Stoma (non-stylet)	<ol style="list-style-type: none"> 1. Make slides 2. Observe and draw
9	10/23/24	Stoma (with stylet)	<ol style="list-style-type: none"> 1. Make slides 2. Observe and draw
10	10/30/24	Esophagus	<ol style="list-style-type: none"> 1. Make slides 2. Observe and draw

11	11/06/24	Intestine and trophic groups	1. Count intestinal cells 2. Read Yeates et al. 1998
12	11/13/24	High quality temporary slides	1. Work on Image collection
13	11/20/24	High quality temporary slides	1. Work on Image collection
14	11/27/24	Reproductive system	1. Make slides 2. Observe and draw
15	12/11/24	Finalize image collection	1. Work on image collection

Disclaimer: This syllabus represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.

COURSE POLICIES:

ASSIGNMENT POLICY: All lab assignments submitted on time have a potential to receive full credit, 1-day late to receive 80% of the full credit, 2-days late to receive 60% of the full credit, and assignments that are more than 2 days late receive 0. All assignments have a rubric to guide you through the assignment.

GRADES AND GRADE POINTS: For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>.

ATTENDANCE AND MAKE-UP WORK: Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>.

ONLINE COURSE EVALUATION PROCESS: Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at: <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at: <https://gatorevals.aa.ufl.edu/public-results/>.

ACADEMIC HONESTY: As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *“we, the members of the university of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either

required or implied: *"on my honor, I have neither given nor received unauthorized aid in doing this assignment."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

SOFTWARE USE: All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

SERVICES FOR STUDENTS WITH DISABILITIES: The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, <https://disability.ufl.edu/>

CAMPUS HELPING RESOURCES: Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,*
www.counseling.ufl.edu
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library
 - Wellness Coaching

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- U Matter We Care, www.umatter.ufl.edu/
- *Career Connections Center*, First Floor JWRU, 32-392-1601, <https://career.ufl.edu/>

Student Complaints:

- Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>
- Online Course: <http://www.distance.ufl.edu/student-complaint-process>