

# NEMATODE MORPHOLOGY AND ANATOMY

NEM 6101 (LECTURE) 2 CREDIT HOURS

LOCATION: ONLINE. PLEASE NOTE THAT CLASS RESOURCES, ANNOUNCEMENTS, AND ASSIGNMENTS WILL BE MADE AVAILABLE THROUGH THE CLASS CANVAS SITE.

FALL

**INSTRUCTOR:** Dorota Porazinska

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**OFFICE HOURS:** Please send me a Canvas email anytime to schedule a zoom 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 BE ABLE TO:

1. Identify, describe, and recognize a variety of morphological and anatomical features used in nematode classification.
2. Analyze and interpret the features of nematodes in the context of evolutionary relationships.

3. Predict the role of features of nematodes in physiology, behavior, and ecology.
4. Analyze and critique scientific publications relevant to nematode morphology and anatomy.

**REQUIRED PAPER READINGS:** (see schedule for dates):

- Al-banna L and SL Gardner. 2024. The phylum Nemata. In: Encyclopedia of Biodiversity (3<sup>rd</sup> edition). Editor: Scheiner, S.M. pp. 404-426. Academic Press.
- Baldwin JG, SA Nadler, and BJ Adams. 2004. Evolution of plant parasitism among nematodes. *Annu. Rev. Phytopathol.*, 42, pp.83-105.
- De Ley P. 2006. A quick tour of nematode diversity and the backbone of nematode phylogeny. In *WormBook: The Online Review of C. elegans Biology [Internet]*. WormBook.
- Pires-daSilva A. 2007. Evolution of the control of sexual identity in nematodes. *Seminars Cell and Developmental Biology*, 18, pp.362-370.
- Lažetić V and DS Fay. 2017, January. Molting in *C. elegans*. In *Worm* (Vol. 6, No. 1, p. e1330246). Taylor & Francis.
- Kiontke K and DH Fitch. 2010. Phenotypic plasticity: different teeth for different feasts. *Current Biology*, 20(17), pp.R710-R712.
- Munn EA and PD Munn. 2002. Feeding and digestion. In: *The Biology of Nematodes*. pp. 211-232. CRC Press.
- Schafer W. 2016. Nematode nervous systems. *Current Biology*, 26(20), pp. R955-R959.

**ADDITIONAL RESOURCES:**

The structure of Nematodes. Bird, A. F. and J. Bird. 1991. Second edition. Academic Press. The e-version of this book is available for purchase [here](#).

Introduction to Nematology. Chitwood and Chitwood. 1974; *The Biology of Nematodes*, Lee, D. 2002; Structure and classification. 2013. Decraemer W and Hunt D. In: *Plant Nematology*, 2<sup>nd</sup> edn. Eds: Perry R and Moens M.

**PREREQUISITE KNOWLEDGE AND SKILLS:** Your curiosity, excitement about learning, and appreciation for nematode diversity!

**INSTRUCTIONAL METHODS:** This course will be conducted entirely online through Canvas for asynchronous assignments and Zoom meetings once a week for one hour for synchronous discussions. The assignments will consist of viewing pre-recorded lectures (1 hr/week), quizzes (30 min/week), readings (3 hrs/week), and discussions (1 hr/week), and other assignments (30 min – 1 hr/week). You are expected to watch lectures and complete readings prior to weekly engagement in activities (e.g., discussions) that will help you to master the content. Additionally, all students will be assigned to present a power point presentation (1 – 2 hrs/week).

**GRADING POLICIES:**

Assignment	Total Points	% of Final Grade
Midterm Exam	100	20%
Final Exam	110	20%
Virtual Practical Exam	120	20%
Power Point Presentation	100	10%
12 Quizzes	300	10%
Leading Discussions	180	10%
Participating in Discussions	90	10%

**EXAMS**

Exams will be limited to 2 hours, and since each exam accounts for 20% of the total grade, as per UF policy, they will be virtually proctored using [Honorlock](#). Midterm will cover 1.1 – 3.2 modules, Final Exam 3.3 – 6.1 modules, and Virtual Practical Exam will involve recognition of morphological features from relevant images used in the course.

**POWER POINT PRESENTATION**

The presentation will be on an approved topic of student’s choice relevant to the topic of the morphology and anatomy of nematodes. The presentation will be in a format of a scientific talk delivered at a typical science meeting (12 min followed by 3 min questions). Grading rubrics will be provided ahead of time. Each student will also be asked to rate presentations of other students. Rating forms will be provided.

**QUIZZES**

Each module will become available at 9:00 am on Wednesdays. Each module will have a narrated lecture that will be summarized in a form of a quiz (a total of 12 quizzes). Quizzes will be open for one week with a submission deadline the night prior to opening of a new module (by Tuesday 9 pm). Quiz questions will include different formats including multiple choice, matching, fill in the blanks, and short answers. They will be open book, limited to 30 minutes, and not proctored.

**READING ASSIGNMENTS for DISCUSSIONS**

All reading assignments will involve: 1. Reading an article (a total of 8 articles, one split to three sections), 2. Leading a discussion via Zoom, and 3. Participating in a discussion (a total of 9 discussions). Grading rubrics for discussions will be provided. Again, articles will become available with opening of every module (9 am on Wednesdays).

**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:**

**FINAL EXAM: December 11, 2024**

Module Schedule with topics and assigned article titles.

Module	Week	Topic	Readings for Discussions
1.1	08/21/24	Introduction, phylogeny, history	De Ley 2006
2.1	08/28/24	General morphology, cuticle markings and structures	Albana & Garnder 2021
2.2	09/04/24	Cuticle anatomy and function	Lazetić and Fay 2017
2.3	09/11/24	Hypodermis and musculature	NA
3.1	09/18/24	Introduction to digestive system	

		<b>PPP Topic Due</b>	
3.2	09/25/24	Stoma	Kiontke and Fitch 2010
3.2	10/02/24	Stoma <b>PPP References &amp; Outline Due</b>	Baldwin et al. 2004
	10/09/24	Review	Munn & Munn 2010
	10/16/24	<b>MIDTERM EXAM</b>	NA
3.3	10/16/24	Esophagus <b>PPP 1<sup>st</sup> Draft Due</b>	Munn & Munn 2010
3.4	10/23/24	Intestine and posterior gut	Munn & Munn 2010
4.1	10/30/24	Secretory/excretory system	NA
5.1	11/06/24	Nervous system <b>PPP 2<sup>nd</sup> Draft Due</b>	Schafer 2016
6.1	11/13/24	Reproductive system	Pires-daSilva 2007
	11/20/24	Review <b>PPP Final</b>	NA
	11/27/24	<b>VIRTUAL PRACTICAL EXAM</b> <b>PPP Final</b>	NA
	12/11/24	<b>FINAL EXAM</b>	

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:

**EXAM POLICY:** Quizzes/exams for the lecture component will be posted online along with specific completion time deadlines.

**ASSIGNMENT POLICY:** All 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.

**COURSE DELIVERY:** All lecture modules, required/extra readings, quizzes and exams will be available on CANVAS. Discussions will be conducted via Zoom.

**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, quizzes, exams).

Use of AI tools, including ChatGPT and Copilot, is permitted in this course for students who wish to use them. To be consistent with our scholarly values, students must cite any AI-generated material that informed their work and use quotation marks or other appropriate indicators of quoted material when appropriate. Students should indicate how AI tools informed their process and the final product, including how you validated any AI-generated citations, which may be invented by the AI. Assignment guidelines will provide additional guidance as to how these tools might be part of your process for each assessment this semester and how to provide transparency about their use in your work.

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](http://www.counseling.ufl.edu)
  - Counseling Services
  - Groups and Workshops
  - Outreach and Consultation
  - Self-Help Library
  - Wellness Coaching
- U Matter We Care, [www.umatter.ufl.edu/](http://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>