

NEMATODE SYSTEMATICS AND PHYLOGENY

NEM 6102 (LECTURE) 2 CREDIT HOURS

LOCATION: ONLINE ONLY. PLEASE NOTE THAT CLASS RESOURCES, ANNOUNCEMENTS, AND ASSIGNMENTS WILL BE MADE AVAILABLE THROUGH **CANVAS** AND DISCUSSIONS VIA **ZOOM**

SPRING 2021

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OFFICE HOURS: Please send an email anytime to schedule a meeting.

COURSE TA OR COORDINATOR: TBD
email:

“Consider the nematode roundworm, the most abundant of all animals. Four out of five animals on Earth are nematode worms – if all solid materials except nematode worms were to be eliminated you could still see the ghostly outline of the most of it in nematode worms.” E. O. Wilson (*paraphrasing N. A. Cobb*)

COURSE DESCRIPTION: The course provides advanced knowledge on taxonomy and systematics of free-living, plant-parasitic, and animal-parasitic nematodes. It covers in depth morphological and molecular characterization of nematode taxa that provide basis for understanding nematode evolutionary relationships and their classification and identification. In addition, taxa are discussed in the context of their physiology, behavior, and ecological functions.

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

1. Recognize and define vocabulary and principles used in the science of taxonomy/systematics/classification.
2. Discuss most common species concepts and modern tools to delimit species.
3. Interpret morphological and molecular characters in order to identify taxa and place them within an evolutionary framework.
4. Identify taxa.

5. Discuss other potential characters (e.g., physiology, behavior, and ecological functions) that can be useful in species delimitation.
6. Analyze and critique scientific publications relevant to nematode morphology and anatomy.

REQUIRED TEXT: None

ADDITIONAL RESOURCES: Handbook of Zoology, Vol 2: Nematoda. 2014. A. Schmidt-Rhaesa, Editor. Walter de Gruyter GmbH, Berlin. It is available for purchase [here](#). Soil and Freshwater Nematodes. 1951. T. Goodey. John Wiley & Sons, Inc. New York. Klasse Nematoda. 1984. I. Andr assy, *Bestimmungsbu cher zur Bodenfauna Europas*.

REQUIRED PAPER READINGS: (see schedule for dates):

- Eyualem-Abebe JG, Adams B, Hope D, Gardner S, Huettel R, Mullin P, Powers T, Sharma J, Ye W, Thomas WK. A position paper on the electronic publication of nematode taxonomic manuscripts. *Journal of nematology*. 2006 Sep;38(3):305.
- Holovachov O, Camp L, Nadler SA. Sensitivity of ribosomal RNA character sampling in the phylogeny of Rhabditida. *Journal of Nematology*. 2015 Dec;47(4):337.
- Pe a-Santiago R,  lvarez-Ortega S. An integrative approach to assess the phylogeny and the systematics of rounded-tailed genera of the subfamily Qudsianematinae (Nematoda, Dorylaimida). *Zoologica Scripta*. 2014 Jul;43(4):418-28.
- Powers T, Harris TS, Higgins RS, Mullin PG, Powers KS. Nematode biodiversity assessments need vouchered databases: A BOLD reference library for plant-parasitic nematodes in the superfamily Criconematoidea. *Genome*. 2020 Jun 11(ja).
- Qing X, Bert W. Family Tylenchidae (Nematoda): an overview and perspectives. *Organisms Diversity & Evolution*. 2019 Sep 1;19(3):391-408.
- Quist CW, Smant G, Helder J. Evolution of plant parasitism in the phylum Nematoda. *Annual Review of Phytopathology*. 2015 Aug 4;53:289-310.
- Ravichandra NG. *Horticultural nematology*. New Dehli: Springer India; 2014 Jun 5.
- Smythe AB, Holovachov O, Kocot KM. Improved phylogenomic sampling of free-living nematodes enhances resolution of higher-level nematode phylogeny. *BMC evolutionary biology*. 2019 Dec 1;19(1):121.
- Smythe AB. Evolution of feeding structures in the marine nematode order Enoplida. *Integrative and comparative biology*. 2015 Aug 1;55(2):228-40.
- Tahseen Q. Nematodes in aquatic environments: adaptations and survival strategies. *Biodiversity Journal*. 2012;3(1):13-40.

PREREQUISITE KNOWLEDGE AND SKILLS: NEM 6101. Your curiosity, excitement about learning, and appreciation for biodiversity!

INSTRUCTIONAL METHODS: This course will be conducted entirely online through asynchronous activities including viewing pre-recorded lectures (1-2 hrs/week), readings (2-3 hrs/week), assignments (30 min – 1 hr/week), and quizzes (30 min/week) on Canvas and synchronous online discussions (2 hr/week) via Zoom. Additionally, all students will

be assigned to present a 15 min power point presentation relevant to the topic of nematode systematics and phylogeny.

GRADING POLICIES:

Assignment	Total Points	% of Final Grade
Midterm Exam	100	20%
Final Exam	100	20%
Virtual Practical Exam	100	20%
PPP Presentations	100	10%
10 Quizzes	100	10%
10 Reading Assignments	200	10%
10 Discussions	100	10%

EXAMS

Exams will be limited to 2 hours, and virtually proctored. Midterm will cover 1.1 – 3.2 modules, Final Exam 3.3 – 4.4 modules, and Virtual Practical Exam will involve recognition of taxa 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 nematode systematics and phylogeny. The presentation will be in a format of a scientific talk delivered at a typical science meetings (12 min followed by 3 min questions). Grading rubrics will be provided ahead of time.

QUIZZES

Each module will become available at 9 am on Wednesdays. Each module will have a narrated lecture that will be summarized in a form of a quiz (a total of 10 quizzes). Quizzes will be open for one week with a submission deadline right prior to the opening of a new module (following Wednesday 9 am). 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.

ASSIGNMENTS and DISCUSSIONS

All assignments will involve: 1. Reading an article (a total of 10 articles) and answer assigned questions, and 2. Participating in a zoom discussion (a total of 10 discussions). Guiding questions and grading rubrics for discussions will be provided. Again, articles will become available with opening of every module (9 am on Wednesdays). Submission of answers to assigned questions will be due prior to the opening of a new module (following Wednesday at 9 am). To participate in discussions, students and instructors will meet via Zoom on Wednesdays at 12:50 – 2:45 pm EST.

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:

Module	Week	Topic	Reading Assignment
1.1	Jan 13, 2021	Introduction	Smythe et al. 2019
1.2	Jan 20, 2021	Taxonomy, Species	Abebe et al. 2006
1.3	Jan 27, 2021	Phylogeny, Orders	Ravichandra 2014
1.4	Feb 03, 2021	Nematode Barcoding Presentation topic due	Powers et al. 2020
2.1	Feb 10, 2021	Enoplida	Smythe 2015

2.2	Feb 17, 2021	Triplonchida Presentation Outline	na
3.1	Feb 24, 2021	Dorylaimida	Peña-Santiago et al. 2014
3.2	March 03, 2021	Mononchida Review	na
	March 10, 2021	MIDTERM EXAM	na
3.3	March 17, 2021	Diectophymatida, Mermithida 15 min presentations	na
4.1	March 23, 2021	Chromadorida, Monhysterida	Tahseen 2012
4.2	March 31, 2021	Plectida	na
4.3	April 07, 2021	Rhabditida: Rhabditina	Holovachov et al. 2015
4.4	April 14, 2021	Rhabditida: Tylenchina	Quist et al. 2015
4.4	April 21, 2021	Rhabditida: Tylenchina Review	Qing and Bert 2019
	April 27, 2021	VIRTUAL PRACTICAL EXAM	na
	May 05, 2021	FINAL EXAM	na

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.

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
- 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>