**Plant Nematology (Pl P 513)**

**Spring 2021 (3 credits)**

**M, W zoom TBA; 1:10 pm – 2:25 pm**

**Instructor**

Cynthia Gleason, office: 261 Plant Sciences Building, office hours by appointment.

**Course Materials**

Materials will be provided by the instructor.

**Course Objectives**

1. Provide an understanding of nematode biology and plant parasitism.

2. Provide knowledge about classical and modern techniques and resources to conduct research

in nematology.

3. Provide experience in evaluating and presenting current scientific nematology literature.

**General Format**

Plant Nematology will be taught through two 75-minute lectures per week. Students will be

expected to actively participate in discussions during class, write an essay and present it to the

class. As part of the discussion, students will be reading and evaluating current literature using a literature study method introduced in the class. Students are expected to read the assigned paper and come to class prepared for a discussion. Discussion days are listed with an \*.

**Student Learning Objectives and Evaluation**

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|  | 1. Have a general | |  | First five sessions | | Midterm 1 and final | | |  |  |  |  |  |
|  | understanding of the | | |  |  |  |  |  |  |  |  |  |  |
|  | morphology and taxonomy | | |  |  |  |  |  |  |  |  |  |  |
|  | of nematodes | |  |  |  |  |  |  |  |  |  |  |  |
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|  | 2. Be able to understand and | | | All sessions | | Three exams, one essay paper and  participation in paper discussions | | | | | | |  |
|  | interpret scientific literature | | |  |  |  |  |  |  |  |  |  |  |
|  | pertaining to nematology | | |  |  |  |  |  |  |  |  |  |  |
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|  | 3. Have an understanding of | | | All sessions | | Midterm 2 and final | |  |  |  |  |  |  |
|  | the mechanisms of | |  |  |  |  |  |  |  |  |  |  |  |
|  | nematode pathogenicity and | | |  |  |  |  |  |  |  |  |  |  |
|  | plant defenses against | | |  |  |  |  |  |  |  |  |  |  |
|  | nematode pathogens | | |  |  |  |  |  |  |  |  |  |  |
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|  | 4. Be able to formulate | | | All sessions | | Three exams, one essay paper and  participation in paper discussions | | | | | | |  |
|  | hypotheses and develop | | |  |  |  |  |  |  |  |  |  |  |
|  | these hypotheses | |  |  |  |  |  |  |  |  |  |  |  |
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**Policy on Participation, Late Assignments and Exams**

Active participation in class discussions is expected. Assignments must be turned in

during class on the due date. Credit will not be given for late assignments except by prior consent

of the instructor. Make-up exams and quizzes will only be provided under special circumstances

and by prior consent of the instructor.

**Grading**

Two midterm exams (100 points each) and one final exam (100 points) will be given during the

semester according to the schedule below. The exams will cover material from lectures,

discussions and reading assignments. The midterm exams are designed to test your in-depth

understanding of nematology. The final exam is cumulative and will test your understanding of

concepts and material not covered in the midterm exams. All exams will made available online at the specified date and time. Students are expected to show up at the zoom meeting and take and finish the exam during the class time.

You will be expected to write an essay paper (75 points), in which you will summarize, discuss and critically evaluate an experimental area of nematode research. Essays will be graded on accuracy and depth of coverage of the topics well as interpretation of the quality of the work and future research needed.

You are also expected to present your topic in class (75 points). Your presentation will be graded on clarity as well as knowledge of the subject including your ability to answer questions. Presentations will be 15 minutes in length and will be presented at the end of class periods in the second half of the semester.

There are four “discussion” days, which will require reading the assigned paper and preparing notes. Points will be received for attendance and participation.

**Point Summary**:

Number Points

Midterms 2 (2x100) 200

Final 100

Essay 75

Class Presentation 75

Class Participation (4x5) 20

Total 470

**Grade Assignment**

94.0 – 100% A

90.0 – 93.9 A-

87.0 – 89,9 B+

83.0 – 86.9 B

80.0 – 82.9 B-

77.0 – 79.9 C+

73.0 – 76.9 C

70.0 – 72.9 C-

60.0 – 69.9 D

< 59.9 F

**M, W 1:10-2:25 pm**

**Course Outline**

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | January 20 Introduction and overview | | |  |  | | January 25 Morphology | |  |  |  | | January 27 Morphology | |  |  |  | | February 1 Classification and taxonomy | | |  |  | | February 3 Sensory perception, survival strategies, hatching | | | | | | February 8 \*Sensory perception paper discussion | | | |  | | February 10 Reproduction and development | | | |  | | February 15 no class | |  |  |  | | February 17 Migratory Endoparasitic nematodes | | | |  | | February 22 Migratory Endoparasitic nematodes | | | |  | | February 24 MIDTERM 1 | |  |  |  | | March 1 \*Migratory Endoparasitic nematodes discussion | | | | | | March 3 Root knot nematodes | |  |  |  | | March 8 Root knot and cyst nematodes | | |  |  | | March 10 \*Root-knot nematode discussion | | | |  | | March 15 Cyst nematodes | |  |  |  | | March 17 no class |  |  |  |  | | March 22 Ectoparasitic nematodes | | |  |  | | March 24 Molecular plant-nematode interactions | | | |  | | March 29 Plant resistance against nematodes | | | |  | | March 31 Nematode genomics | | | | | | April 5 MIDTERM 2 | |  |  |  | | April 7 \*Molecular plant-nematode interactions paper discussion | | | | | | April 12 Nematode management - chemical | | | |  | | April 14 Nematode management - biological and cultural | | | | | | April 19 \*Nematode management discussion paper | | | |  | | April 21 Population dynamics and biotechnology, student talks 1-3 | | | | | | April 26 student talks 3-8 | |  |  |  | | April 28 student talks 9-15  **May 5 4:10 -7:00 pm Comprehensive exam** | |  |  |  | |
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**WSU Academic Honesty**

Academic integrity will be strongly enforced in this course. Any student caught cheating on the

exam will be given an F grade for the course and will be reported to the Office Student Standards

and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010

(3). It is strongly suggested that you read and understand these definitions.

**WSU Disability Statement**

Students with Disabilities: Reasonable accommodations are available for students with a

documented disability. If you have a disability and need accommodations to fully participate in

this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417)

to schedule an appointment with an Access Advisor. All accommodations MUST be approved

through the Access Center. For more information, contact a Disability Specialist: 509-335-

3417 http://accesscenter.wsu.edu, Access.Center@wsu.edu

**WSU Safety and Emergency Notification:**

Washington State University is committed to enhancing the safety of the students, faculty, staff,

and visitors. It is highly recommended that you review the Campus Safety Plan

(http://safetyplan.wsu.edu/) and visit the Office of Emergency Management web site

(http://oem.wsu.edu/) for a comprehensive listing of university policies, procedures, statistics,

and information related to campus safety, emergency management, and the health and welfare of

the campus community.

###### **COVID-19 Policy**

Students are expected to abide by all current COVID-19 related university policies and public health directives, which could include wearing a cloth face covering, physically distancing, self-attestations, and sanitizing common use spaces.  All current COVID-19 related university policies and public health directives are located at [**https://wsu.edu/covid-19/**](https://wsu.edu/covid-19/).  Students who do not comply with these directives may be required to leave the classroom; in egregious or repetitive cases, students may be referred to the Center for Community Standards for university disciplinary action.

Discussion papers:

**1. Feb 8th**: Čepulytė, R., Danquah, W.B., Bruening, G. *et al.* Potent Attractant for Root-Knot Nematodes in Exudates from Seedling Root Tips of Two Host Species. *Sci Rep* **8,**10847 (2018). https://doi.org/10.1038/s41598-018-29165-4

**2. March 1st**: Vieira, P., Vicente, C.S.L., Branco, J., Buchan, G., Mota, M., and Nemchinov, L.G. (2021). The root lesion nematode effector Ppen10370 is essential for parasitism of Pratylenchus penetrans. Molecular Plant-Microbe Interactions®.

**3. March 10th**: Dutta, T.K., Papolu, P.K., Banakar, P., Choudhary, D., Sirohi, A., and Rao, U. (2015). Tomato transgenic plants expressing hairpin construct of a nematode protease gene conferred enhanced resistance to root-knot nematodes. Frontiers in Microbiology *6*, 260.

**4. April 7th**: Manohar, M., Tenjo-Castano, F., Chen, S. *et al.* Plant metabolism of nematode pheromones mediates plant-nematode interactions. *Nat Commun* **11,**208 (2020). https://doi.org/10.1038/s41467-019-14104-2

**5. April 19th**: Martínez-Medina, A., Fernandez, I., Lok, G.B., Pozo, M.J., Pieterse, C.M.J., and Van Wees, S.C.M. (2017). Shifting from priming of salicylic acid- to jasmonic acid-regulated defences by Trichoderma protects tomato against the root knot nematode *Meloidogyne incognita. New Phytologist 213*, 1363-1377.