

## **Plant Nematology (PI P 513)**

**Spring 2017 (3 credits)**

**M, W Johnson Hall 346; 1:10 pm – 2:25 pm**

### **Instructor**

Cynthia Gleason, office: 335 Johnson Hall, 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**

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

### **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. 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 topic as 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. Points are awarded for class participation in paper discussions. There are four “discussion” days, which will require reading the assigned paper and preparing notes. Points will be received for attendance and participation for each discussion day.

### **Point Summary:**

Number Points

Midterms 2 (2x100) 200

Final 100

Essay 75

Class Presentation 75

Class Participation (4x5) 20

Total 370

### **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**

January 9 Introduction and overview  
January 11 Morphology  
January 16 No class  
January 18 Morphology  
January 23 Classification and taxonomy  
January 25 Root-knot nematodes  
January 30 Root-knot nematodes  
February 1 Cyst nematodes  
February 6 Cyst nematodes  
February 8 Migratory endoparasites  
February 13 Migratory endoparasites  
February 15 MIDTERM 1  
February 20 No class  
February 22 Ectoparasites  
February 27 \*Ectoparasites -discussion  
March 1 Reproduction and development  
March 6 Sensory perception, survival strategies, hatching  
March 8 \* Sensory perception and movement -discussion  
March 13 No class - Spring Break  
March 15 No class - Spring Break  
March 20 Molecular plant-nematode interactions  
March 22 \*Molecular plant-nematode interactions- discussion  
March 27 Molecular plant-nematode interactions  
March 29 Molecular plant-nematode interactions  
April 3 Resistance genes  
April 5 MIDTERM 2  
April 10 Resistance and genetic engineering  
April 12 \* Resistance and genetic engineering-discussion  
April 17 Genomics  
April 18 Population dynamics, sampling  
April 24 Biological and cultural management  
April 26 Chemical management  
**May 3 3:10- 5:10 pm** Comprehensive exam

**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](mailto: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.

## Discussion days

Practice paper (*I will hand out notes, we will not discuss in class*): The Infection of Cucumber (*Cucumis sativus* L.) Roots by *Meloidogyne incognita* Alters the Expression of *Actin-Depolymerizing Factor (ADF)* Genes, Particularly in Association with Giant Cell Formation, *Front Plant Sci.* 2016; 7: 1393.

### 1. February 27

Characterisation and functional importance of  $\beta$ -1,4-endoglucanases from the potato rot nematode, *Ditylenchus destructor*, *Nematology* 16 (2014) 505-517

### 2. March 8

Utility of Host Delivered RNAi of Two FMRF Amide Like Peptides, flp-14 and flp-18, for the Management of Root Knot Nematode, *Meloidogyne incognita*, *PLoS One.* 2013 Nov 6;8(11):e80603

### 3. March 22

The Root-Knot Nematode Calreticulin Mi-CRT Is a Key Effector in Plant Defense Suppression, *MPMI* Vol. 26, No. 1, 2013, pp. 97–105.

### 4. April 12

Transgenic soybean overexpressing GmSAMT1 exhibits resistance to multiple-HG types of soybean cyst nematode *Heterodera glycines*, *Plant Biotechnology Journal* (2016) 14, pp. 2100–2109