

Fungi and Human Health

11:776:415 (3 credits)

Spring Semester (even years)

CONTACT INFORMATION

Instructor: Dr. Joan Bennett
Office Location: 296C Foran Hall, 59 Dudley Rd., New Brunswick, NJ 08901
Phone: 848-932-6223
E-mail: profmycogirl@yahoo.com
Office Hours: by arrangement

Co-Instructor: Dr. James White
Office Location: 294A Foran Hall, 59 Dudley Rd., New Brunswick, NJ 08901
Phone: 848-932-6286
E-mail: jwhite@aesop.rutgers.edu
Office Hours: by e-mail appointment

Co-Instructor: Dr. Ning Zhang
Office Location: 201B Foran Hall, 59 Dudley Rd., New Brunswick, NJ 08901
Phone: 848-932-6348
E-mail: zhang@sebs.rutgers.edu
Office Hours: by arrangement

COURSE DESCRIPTION

The best known fungi are macroscopic (e.g. mushrooms, truffles and their relatives) but the most abundant forms of fungal life are the microscopic molds and yeasts. Fungi impact human health directly as infectious agents, allergens and toxin producers. They also play important roles in food safety and can comprise food supplies through plant pathogenesis. On the positive side, they are important in food production and as agents of fermentation. Some of the most potent drugs isolated during the 20th century (penicillin, the statins, immunosuppressants) are fungal metabolites. This course will address these broad topics through lectures, discussions, readings, and special projects.

This course is intended for advanced undergraduates and graduate students across Rutgers University who will benefit from learning about the impact of fungi on human health, nutrition and drug discovery. The course may be of particular interest to students involved in the study of food science and nutrition; animal and health sciences; microbiology; pharmacology; and plant pathology.

COURSE WEBSITE, RESOURCES AND MATERIALS

- Course website: Sakai
- Course materials will be posted to Sakai after class
- Supplementary reading: Several mycology textbooks, as well as other books on medical mycology, medical fungi, mushroom cultivation, and related topics, are available in 205 Foran Hall

PREREQUISITE

01:119:115-116 General Biology (two semesters) OR equivalent

COURSE LEARNING GOALS

(Link to Plant Biology Undergraduate Program Goals: <http://plantbiology.rutgers.edu/undergrad/plantbiology/>)

By the end of this course, the student will be able to:

1. Demonstrate a basic understanding of the fungi that impact human health in a positive or negative way (addresses program goal 1)
2. Define the specialized vocabulary of medical mycology (addresses program goal 1)
3. Integrate an understanding of fungi into other realms of biology and the health sciences (addresses program goal 2)
4. Formulate information about fungi into new understanding of general topics in the health sciences and cognate disciplines (addresses program goals 2 and 4)
5. Apply information about fungi to everyday life (addresses program goal 3)

ASSIGNMENTS/RESPONSIBILITIES AND ASSESSMENT

Grading

- Two midterm exams (25% each) 50%
- Final exam (comprehensive) 30%
- Special project 10%
- Attendance and participation 10%

Grades will be classified based on Rutgers approved system: A, B+, B, C+, C, D, and F.

Special project: This small group, open ended project is subject to instructor approval. Examples of project ideas include: a report on a field trip to an mushroom farm; organization of a small cookbook on edible fungi and fermented foods, plus a class room cooking demonstration; development of a learning module on poison control centers; an analysis of mold remediation companies; an outreach program on urban housing and asthma; a review of antifungal drug development as conducted at a local pharmaceutical company; a project on the medical implications to public health of the emergence of widespread development of bacterial resistance to penicillin and other beta lactams; organization of a summary of web-based teaching tools about fungi and human health; an organized collection of mycological humor; mycology in art; etc.

Learning goals assessment: Specific questions on exams will be used to assess student knowledge of all course learning goals. In the special project, students will communicate an integration of technical knowledge with the broader issues associated with fungi in the health sciences, environment, and everyday life (course learning goals 3 to 5). The percentage score on these assessments will determine the level of mastery: >90% outstanding; 80-89% good; 70-70% satisfactory; <69% unsatisfactory.

PARTICIPATION GRADE AND ABSENCE POLICY

Students are expected to attend all classes – attendance will be recorded. More than two unexcused absences will have a negative impact on grade. Students who expect to miss class may contact the instructor via e-mail prior to the

missed class or may use the University absence reporting website (<https://sims.rutgers.edu/ssra/>) to indicate the date and reason for the absence. An e-mail is automatically sent to the instructor.

COURSE SCHEDULE

| Week | Topic |
|------|---|
| 1 | Introduction What are fungi? Basics of morphology and biochemistry |
| 2 | Theories about disease. What is a pathogen? Mycoses: history, concepts, classification |
| 3 | Mycoses: superficial and subcutaneous Mycoses: dimorphism General groups for mycophagy and special projects |
| 4 | Fungi in folklore and history |
| 5 | Mycoses: systemic and other Antifungal drugs Special project topics due |
| 6 | Exam I Fungi as food: “mycophagy” |
| 7 | Fungi in food and drink – fermentations Fungi and food safety – spoilage and introduction to mycotoxins |
| 8 | Dinner with fungi on the menu (class members bring fungal foods to class) Fungal toxicology – mushroom poisons Spring recess |
| 9 | Fungal toxicity – mycotoxins Fungi, allergy and indoor air quality |
| 10 | Hallucinogenic fungi and hallucinogens Fungi as pharmaceuticals: traditional medicine, antibiotics |
| 11 | Fungi as pharmaceuticals: statins and immune suppressants Special topic – <i>Cryptococcus</i> and its treatment |
| 12 | Introduction to fungal systematics, phylogeny, and identification Special topic – Amanitaceae: taxonomy and toxins |
| 13 | Exam II Presentation of student projects |
| 14 | Presentation of student projects Final Exam (comprehensive, date to be determined) |

FINAL EXAM/PAPER DATE AND TIME

The final exam is comprehensive. The Online Final exam Schedule: <http://finalexams.rutgers.edu/>

ACCOMODATIONS FOR STUDENTS WITH DISABILITIES

Please follow the procedures outlined at <https://ods.rutgers.edu/students/registration-form>. Full policies and procedures are at <https://ods.rutgers.edu/>

ACADEMIC INTEGRITY

The university's policy on Academic Integrity is available at <http://academicintegrity.rutgers.edu>

The principles of academic integrity require that a student:

- Properly acknowledge and cite all use of the ideas, results, or words of others.
- Properly acknowledge all contributors to a given piece of work.
- Make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.
- Obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
- Treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- Uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that:

- Everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- All student work is fairly evaluated and no student has an inappropriate advantage over others.
- The academic and ethical development of all students is fostered.
- The reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

STUDENT WELLNESS SERVICES

Just In Case Web App <http://codu.co/cee05e>

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901 / www.rhscaps.rutgers.edu/

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Scarlet Listeners

(732) 247-5555 / <http://www.scarletlisteners.com/>

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.