

Course Syllabus – IMS 530

Course Information

Course Number: IMS 530 SP24
Course Name: Frontiers in Microbiology
Term: SP 2024
Start Date: 04/02/2024
End Date: 06/21/2024
Credits: 3.0

Meeting Days / Times

Tuesdays and Thursdays, 10:00-11:30pm PT / 1:00-2:30pm ET
(See Calendar in Canvas for the most up-to-date schedule.)

Location

CA: Seminar Room (Hazen Theory Building)
FL: A212

Course Managers

Role	Last Name	First Name	Email Address
Course Director	Constantinides	Michael	constantinides@scripps.edu
Course Director	Hang	Howard	hhang@scripps.edu
Course Director	Lasker	Keren	klasker@scripps.edu
Course Director	Racki	Lisa	lracki@scripps.edu
TA	Bhandula	Varaang	vbhandula@scripps.edu

Course Description

The Scripps Microbiology course will cover fundamental mechanisms in microbes (bacteria, fungi, archaea and parasites), their interactions with each other and host organisms as well as therapeutics. The range of topics will include microbial cell division, nucleic acid and protein regulation, intra- and inter-cellular signaling, metabolism, virulence mechanisms, microbiota functions, commensal and pathogenic interactions with hosts, and development of therapeutics and resistance mechanisms.

Program Learning Outcomes

By the end of the program, students will have accomplished these objectives:

PLO1: Original Research – graduate students are expected to develop the skills critical for generating high-quality research output. This would include absorbing, recalling, and contextualizing scientific knowledge, evaluating scientific information and data, creating testable hypotheses and investigating hypotheses, mastering scientific tools and techniques, displaying ethical behavior, and receiving and giving feedback.

PLO2: Communication – graduate students are expected to demonstrate the oral, written, and media skills to effectively communicate the impact of a study or a body of work to the greater scientific community and to the public at large using a number of methods.

PLO3: Critical Thinking – graduate students are expected to develop a self-directed process to analyze information, form opinions or judgments, and use this process to improve the quality of their scientific thoughts, navigate problems, and make informed decisions.

PLO4: Intellectual Curiosity – graduate students are expected to acquire the capacity to build their intellectual curiosity and demonstrate problem solving approaches that serve their professional growth and ability to impact a field.

PLO5: Career and Professional Development – graduate students are expected to develop a variety of transferable skillsets throughout their graduate experience, including management and leadership, inclusiveness, resilience, scientific rigor, collaboration, accountability, time management, teamwork, networking, and career planning.

For a detailed description of each outcome and specific success indicators, please refer to this web page: <https://education.scripps.edu/graduate/doctoral-program/>.

Course Learning Outcomes

Upon completion of this course students will be able to:

CLO1: Understand fundamental cellular processes in microbes from cell division, gene and protein regulation to small molecule metabolism and signaling.

CLO2: Learn about inter-microbial and host interactions involvement in symbiosis and infection.

CLO3: Understand the significance and impact of microbial functions on host physiology and disease.

CLO4: Learn fundamental mechanisms of antibiotics, resistance mechanisms and development of novel anti-infective therapeutics.

CLO5: Acquire knowledge of techniques in the analysis of microbes such as microbiology, genetics, nucleic, protein and metabolite analysis methods.

CLO6: Identify specific experimental results; formulate them into important new questions; Design experiments to answer these questions and devise alternative approaches to each definitive conclusion. Paper/journal club discussion lectures will be designed to meet these criteria.

CLO7: Develop succinct presentation skills; describe the background, questions addressed, approach, conclusions, as well as strengths and weaknesses of scientific papers.

Background Preparation (Prerequisites)

Bachelor's degree in science.

Course Materials

Useful to consult: Brenda A. Wilson, Malcom Winkler, Brian T. Ho. *Bacterial Pathogenesis, 4th edition*. ISBN:978-1-555-81940-8

Class Format

The format of the course will involve lectures from Scripps faculty (Tuesday), seminars from leading experts in each respective topic or journal club of related publications for each respective topic (Thursday) and development of original research proposals (2-page and oral presentation) from the students. The students will be evaluated on their attendance and participation in the lectures, seminars, journal club and written summaries as well as development of original research proposals. The original research proposal must be different from the students own research or rotation projects.

Expectations and Logistics

Attend seminars and ask questions. Prepare for paper/journal club discussions. Write and present excellent original research proposals.

Class preparation

Review *Bacterial Pathogenesis: A Molecular Approach, 4th Edition*

Attendance Statement

Students are expected to attend all classes. Students who are unable to attend class must seek permission for an excused absence from the course director or teaching assistant. Unapproved absences or late attendance for three or more classes may result in a lower grade or an "incomplete" for the course. If a student has to miss a class, he or she should arrange to get notes from a fellow student and is strongly encouraged to meet with the teaching assistant to obtain the missed material.

Scientific and Professional Ethics

The work you do in this course must be your own. Feel free to build on, react to, criticize, and analyze the ideas of others but, when you do, make it known whose ideas you are working with. You must explicitly acknowledge when your work builds on someone else's ideas, including ideas of classmates, professors, and authors you read. If you ever have questions about drawing the line between others' work and your own, ask the course professor who will give you clear

guidance. Exams must be completed independently. Any collaboration on answers to exams, unless expressly permitted, may result in an automatic failing grade and possible expulsion from the Graduate Program.

Technology Requirements and Support

For issues related to Canvas, please contact the Graduate Office by email at: gradprgm@scripps.edu or by phone at: 858-784-8469.

Assignments and Modules

Assignments can be categorized into groups with clear naming conventions, such as Presentations or Participation. The categorized groups can then be given a weighting in relation to the final grade.

Course Grading

Grading is in accordance with the academic policies of the Skaggs Graduate School. The breakdown of grading is as follows:

- General Assignments: 25%
- Participation: 25%
- Final Presentation: 50%

Letter Grade	Percent	GPA	Description
A	93-100	4.00	Outstanding achievement. Student performance demonstrates full command of the course subject matter and evinces a high level of originality and/or creativity that far surpasses course expectations.
A-	90-92	3.67	Excellent achievement. Student performance demonstrates thorough knowledge of the course subject matter and exceeds course expectations by completing all requirements in a superior manner.
B+	87-89	3.33	Very good work. Student performance demonstrates above-average comprehension of the course subject matter and exceeds course expectations on all tasks as defined in the course syllabus. There is notable insight and originality.
B	83-86	3.00	Satisfactory work. Student performance meets designated course expectations and demonstrates understanding of the course subject matter at an acceptable level.

B-	80-82	2.67	Marginal work. Student performance demonstrates incomplete understanding of course subject matter. There is limited perception and originality.
C+	77-79	2.33	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.
C	73-76	2.00	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.
P	73-100	0.00	Satisfactory work. Student performance demonstrated complete and adequate understanding of course subject matter. Course will count toward degree.
F	0-72	0.00	Unacceptable work/Failure. Student performance is unacceptably low level of knowledge and understanding of course subject matter. Course will not count toward degree. Student may continue in program only with permission of the Dean.
I		0.00	Incomplete is assigned when work is of passing quality but is incomplete for a pre-approved reason. Once an incomplete grade is assigned, it remains on student's permanent record until a grade is awarded.
W		0.00	Withdrew from the course with Dean's permission beyond the second week of the term.

- All courses will be recorded and maintained in the student's permanent academic record; only courses that apply towards the degree will appear on the academic transcript. Non-credit or audited courses will not appear on the transcript.
- 4 core courses taken for a letter grade (pass = B- or higher for a core course)
- 2 elective courses taken pass/fail (pass = A, B, C for an elective)

Course Summary

Date	Details
Tue Apr 2, 2024	Intro to Microbiology (Hang)
Thu Apr 4, 2024	Bacterial Cell Division (Lasker)
Tue Apr 9, 2024	Guest Lecturer: Erin Goley (Johns Hopkins)
Thu Apr 11, 2024	Bacterial Gene Regulation (Racki)
Tue Apr 16, 2024	Journal Club (Lasker)

Thu Apr 18, 2024	Guest Lecturer: Eduardo Groisman (Yale)
Tue Apr 23, 2024	Bacterial Metabolism (Racki)
Thu Apr 25, 2024	Journal Club (Racki)
Tue Apr 30, 2024	Bacterial Signaling (Lasker)
Thu May 2, 2024	Journal Club (Bhandula), OR Guest Lecturer (Jordan)
Tue May 7, 2024	Gram positive bacterial pathogenesis (Hang)
Thu May 9, 2024	Journal Club (Hang)
Tue May 14, 2024	Gram negative bacterial pathogenesis (Hang)
Thu May 16, 2024	Journal Club (Hang)
Fri May 17, 2024	No Class (Commencement)
Tue May 21, 2024	Mycobacteria pathogenesis (Park)
Thu May 23, 2024	Guest Lecturer: Jeremy Rock (Rockefeller)
Mon May 27, 2024	No Class (Memorial Day)
Tue May 28, 2024	Microbiota (Constantinides)
Thu May 30, 2024	Antibiotics (Badran)
Tue Jun 4, 2024	Student Proposal Presentations/Review
	Final Presentation-Oral presentation and review of original research proposals
Thu Jun 6, 2024	Guest Lecturer: Gerry Wright (McMaster)
Wed Jun 19, 2024	No Class (Juneteenth)