**Spring 2018**

**Civ Env 495-0-36: Molecular Microbiology**

TTh 2:00-3:20 PM
Annenberg Hall G30

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**Description**

An in-depth look at current molecular methods used to study environmental microbiology. Fundamentals of molecular microbiology, supplemented with discussions of readings from the literature. Creative and critical analysis of study design through proposal writing and reviewing.

This course will focus onpolymerase chain reaction and derivatives (qPCR, RT-PCR, cloning, CRISPR); DNA sequencing (amplicon sequencing, whole genome sequencing, metagenomics); proteins (proteomics, proteogenomics, metaproteomics); metabolomics; and imaging. Special topics will be considered.

**Readings**

There is no required textbook. Readings will be taken from the literature from journals such as *Nature*, *Environmental Microbiology*, *Applied Environmental Microbiology*, *ISME*, *Proteomics*, etc.

**Learning Objectives**

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

* Identify methods appropriate to research questions
* Evaluate the application of methods in current research
* Develop a research proposal wherein methods are explicitly linked to hypotheses

**Assessment**

* Participation (10%)
* Paper discussion (20%)
* Midterm evaluations (2; 10% each)
* Final paper: letter of intent, 5-page NSF-style preproposal (25%)
* Proposal review: participation in a panel to review peers’ proposals (25%)

**Participation:** This class is interactive. Students are expected to ask questions and offer responses during class. Activities will require students to work independently and in groups. Some activities may also involve physical movement.

**Student-led paper discussions:** Each student will present a paper of their choosing and lead a discussion. Grades will be based on demonstrated preparation, comprehension and/or informed questioning of the paper, and ability to communicate with and engage the class.

**Mid-term evaluations:** There will be two evaluations during this course. One is a take-home exam where students are welcome to use any resources at their disposal. The aim of this exam is for students to demonstrate mastery of the course content. The other is an in-class review of previous students’ proposals; this activity will prepare students for the final evaluations.

**Final Paper:** Students will write a research proposal incorporating one or more methods discussed in class. Grading criteria will reflect the learning objectives as well as the assessment criteria of the Environmental Engineering and Science Candidacy Exam. Details will be provided before the end of the term, and a rubric will be provided.

**Proposal Review:** This activity will take place during exam week and will follow the format of the second mid-term evaluation. Details will be provided before the end of the term.

**Course Policies**

**Academic Integrity**

Students in this course are expected to comply with the policies found in the booklet, "Academic Integrity at Northwestern University: A Basic Guide."   All papers submitted for credit in this course must be sent through Canvas.  Your written work may be electronically tested for plagiarized content.  For details regarding academic integrity at Northwestern, visit: <http://www.northwestern.edu/uacc/>.

**AccessibleNU**

In compliance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act, Northwestern University is committed to providing equal access to all programming. Any student requesting accommodations related to a disability or other condition is required to register with AccessibleNU (847-467-5530) and provide professors with an accommodation notification from AccessibleNU, preferably within the first two weeks of class. All information will remain confidential.

**The course schedule can be found online at** [**https://goo.gl/QaqwYt**](https://goo.gl/QaqwYt)