

# Syllabus

## MBIO 601 Molecular Microbiology

Fall 2019 (Tuesdays and Thursdays, 3-4 p.m.)

**K Building (Nursing School) (door code 2055), Rm 2034**

**Course Director: Jim Graham ([j.graham@louisville.edu](mailto:j.graham@louisville.edu))**

### Lecturers:

Dr. Richard Miller ([richard.miller@louisville.edu](mailto:richard.miller@louisville.edu))

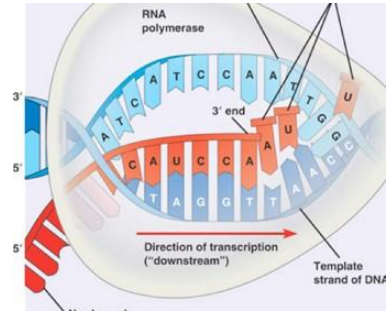
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### Course Content

This course is intended for graduate students that will work in fields where microbiology is the major focus, or of high relevance. It is centered on the topic of prokaryotic molecular biology, an area now distinct from that of eukaryotic cells and more complex organisms. We cover the biochemical make-up, function, and diversity microorganisms, primarily bacteria. The course begins with topics in the area of microbial structure, growth, metabolism, DNA replication, genetic exchange, transcription, protein synthesis and secretion, and relevant regulatory mechanisms, with emphasis on areas relevant to microbial pathogenicity. Functional aspects covered include genomics, antibiotic action, mechanisms of delivery of bacterial factors into host cells, biofilm formation, nutrient acquisition in vivo, and concepts of microbial virulence.

Material will be presented at a first year graduate level, assuming that the students have a background in microbiology from previous undergraduate coursework, or have a high interest and sufficient motivation to learn at the state of the art level in this field. The course is primary intended as a required class for all students seeking a PhD degree in Microbiology and Immunology, and will therefore provide all the basic foundation of knowledge need to build on in becoming an expert in the field or closely related fields in Biology and Oral Biology. This course is a prerequisite for the advanced medical bacteriology graduate seminar in the department, Microbial Pathogenesis (MBIO 687). Virology is covered in a separate required course (MBIO 618) that is directed by Dr. Chung.

The textbook for the course is the 3<sup>rd</sup> Ed of Snyder and Champness, Molecular Genetics of Bacteria, which is available as a low cost used textbook, as it is no longer the most recent addition. Instructor-provided handouts will however for the primary required study material, as provided at the time of the lecture. Students may also want to consult introductory microbiology textbooks in the library (or online) to review information and obtain additional perspectives on the topics covered.

We will meet on **Tuesdays and Thursdays from 3-4 p.m. in Room K2034.** Other locations may be used on occasion as arranged by individual lecturers. The lecture schedule is shown below.

## **Evaluations and Grading Policy**

Grades for this course will be based on the evaluation of student performance in three examinations, according to the following percentages:

Exam I..... 33.3 % (9 lectures)  
Exam II..... 33.3 % (9 lectures)  
Exam III.....33.3 % (9 lectures)

Each exam will cover the lecture material for that section in the course (no comprehensive final). These exams will be primarily in essay or short answer format. The amount of material and level of coverage will require significant study and note taking, including review of lecture recordings online and time to study for each of the three exams. Each lecturer will be responsible for writing their own questions.

## **Final Grades**

The final letter grades for this course will be based on achieving the following percentages for the course:

A+ 96-100  
A 89-95  
A- 88  
B+ 85-87  
B 79-84  
B- 78  
C+ 75-77 (note, a B- or above is required by most UofL graduate programs)  
C 70-74  
D 69-63  
F 62 or less

The course director may adjust the scores for all students on individual exams based on the class average or high score. These changes will only potentially increase student scores.

## **Attendance**

Course work is an essential and valuable part of your graduate students training that goes beyond your individual dissertation or thesis work. As this class only meets twice a week for just 3 months, **your attendance at all lectures is required**, unless prior arrangements are made with the course director. (You are expected to plan your experiments around these lectures and exams, and it is your responsibility to convey your commitment to additional learning outside the lab to your advisor.)

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**Fall 2018 (Tuesdays and Thursdays, 3-4 p.m.)**

Aug 28, Tue Aug 30, Th	Course Orientation Introduction to the microbial world	Graham Miller
Sept 4, Tues Sept 6, Th	Microbial diversity – structure/function Microbial diversity – environmental habitats and growth	Miller Miller
Sept 11, Tues Sept 13, Th	Gram (+) cell wall structure/ peptidoglycan biosynthesis Gram (-) cell envelope structure and biosynthesis	Graham Graham
Sept 18, Tues Sept 20, Th	Metabolism, transport, energetics I Metabolism, transport, energetics II	Roberson Roberson
Sept 25, Tues Sept 27, Th	DNA replication DNA repair and recombination	Graham Graham
<b>Oct 2, Tues</b> Oct 4, Th	<b>Exam I</b> Transcription	Graham Graham
Oct 9, Tues Oct 11, Th	<b>Fall Mid-term Break</b> Transcription elongation and translation	Graham
Oct 16, Tues Oct 18, Th	Functional RNAs Genetic exchange and plasmids	Graham Graham
Oct 23, Tues Oct 25, Th	Bacteriophages and restriction Protein secretion	Graham Graham
Oct 30, Tues <b>Nov 1, Th</b>	Bacterial effector delivery <b>Exam II</b>	Warawa
Nov 6, Tues Nov 8, Th	Metal acquisition and nutritional immunity Antibiotics and resistance	Lawrenz Graham
Nov 13, Tues Nov 15, Th	Two-component regulation Quorum sensing	Graham Demuth
Nov 20, Tues Nov 22, Th	Biofilms <b>Thanksgiving vacation</b>	Demuth
Nov 27, Tues Nov 29, Th	Bacterial genomics Concepts of bacterial pathogenesis	Graham Abu Kwaik
Dec 4, Tues <b>Dec 6, Th</b>	Finals Study Time <b>Exam III</b>	

### **Title IX/Clery Act Notification**

Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain **confidential** support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).

Disclosure to **University faculty or instructors** of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is **not confidential** under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.

For more information, see the Sexual Misconduct Resource Guide (<http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure>).