

Title: Experimental models in Molecular, Cellular and Developmental Biology

Course Number: MCDB 614

Fall term

3 credits

Time M, W 10:30-12

Location 4140 Kraus Natural Science Building

Course Description – This course introduces beginning Ph.D. students to model organisms widely used in molecular, cellular and developmental biology research and to several powerful experimental approaches that can be used to study these organisms. The emphasis is on understanding the types of experiments for which each organism is particularly well suited.

Format- The course consists of a series of two week modules, each taught by a different faculty member. In each module, the goal will be to introduce the students to the key features of this model or approach that make it a powerful, and also the limitations of the approach. In a typical module, the faculty member will spend about half the time giving 45 minutes lectures that introduce the students to the area of study. The other half of the time will be spent on other activities that require interaction between the faculty members and the students. Possibilities include having the students discuss papers that are particularly outstanding examples of the use of that model system, carrying out analysis of sample data to help them better understand the approach and group projects to design potential new experiments that could exploit the advantages of the system.

Enrollment limit- To facilitate discussion, enrollment in the course will be capped at 25.

Students- This course is required of all first year MCDB direct entry PhD students. It is open to any PIBS student who wishes to substitute it for one of the PIBS core courses (Biochem 510, CDB 520, HG 541) and is very strongly recommended for all PIBS students who are considering joining the MCDB program.

As long as spaces are available, it is also open to other PhD students at the University of Michigan who have appropriate backgrounds.

Master's students and advanced undergraduates are not eligible to take this course.

Prerequisites- It is expected that students will have completed undergraduate courses in genetics and biochemistry, or their equivalent.

Course Web site: Accessible through ctools.umich.edu

Class Schedule

Module	Dates	Instructor	Topic
Module 1	Sep. 6, 11, 13, 18	Richard Hume Professor of MCDB	Quantitative imaging of living mammalian cells
Module 2	Sep. 20, 25, 27, Oct 2	Patricia Wittkopp Assistant Professor of MCDB and of EEB	Drosophila
Module 3	Oct 4, 9, 11, 18	Cunming Duan Associate Professor of MCDB	Zebrafish
Module 4	Oct 23, 25, 30, Nov 1	Laura Olsen Associate Professor of MCDB	Subcellular Protein Localization
Module 5	Nov 6, 8, 13, 15	Tzvi Tzfira Assistant Professor of MCDB	Arabidopsis
Module 6	Nov 20, 27, 29, Dec 4	James Bardwell Professor of MCDB & Investigator, Howard Hughes Medical Institute	Genetic and genomic approaches to understanding bacterial function

Student presentations Dec 6, 11, 13

Formal course work –

There is no midterm or final exam in this course. Grades will be assigned as follows:

Module grades (90% of total , 15% each)

Each instructor will determine his or her own scheme for grading of the module, and will post it on the course web page at least on week before the start of the module. Some module grades may be based exclusively on participation in discussion, while others may require completion of homework assignments, or of quizzes.

Group presentation and presentation report (10%)

The last three class sessions will be devoted to presentations by groups of students. Each group will select a model organism from a list of ones that will not be discussed in detail this year. (Possibilities include *Caenorhabditis elegans*, *Xenopus laevis*, *Saccharomyces cerevisiae*, *Schizosaccharomyces pombe*, *Dictyostelium discoideum*, *Nicotiana tabacum*, *Caulobacter crescentus* or *Gallus gallus*). The group will have one 90 minute class period to introduce their system to their classmates and instructors, and to explain on or more exciting discoveries that have been made using this system. The format to be used, and the extent to which each person in the group speaks, is the choice of the group. On the day of the presentation, the group must

also turn in a 1-2 page written document, indicating the major contributions that each person made to the group project.

Schedule- October 12 – Students divided into three groups and select organism. Date of presentation assigned by random draw.

Group with the earliest date gets first choice of organism, group with next earliest date gets second choice of organism.

One week before presentation- Notify classmates of any papers that need to be read for their session. No more than 3 papers can be assigned.

Dates of presentations- December 6, 11, 13