PBL/BMB/CSS 856: Plant Molecular and 'Omic Biology
Syllabus - Spring 2016

Instructors:	**Department/Academic Unit:**	**Office:**	**Phone:**
Robert Last*	Biochemistry/Plant Biology	301 BCH	2-3278
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Brief Description of Course: The intention of the course is to provide a survey of plant molecular biology, molecular genetics, genomics and cell biology emphasizing recent advances in higher plants.

Prerequisite: college-level genetics course (equivalent to ZOL/PBL 341) and an understanding of molecular biology and gene expression are ***essential*.** Please do not enroll in the course if you do not have this background. Please contact R. Last if you have any doubts about the suitability of your preparation.

Recitation (recommended for all students): During most weeks TA Matt Bedewitz (bedewitz@msu.edu) will provide a one-hour recitation, in which molecular techniques and experiments used in the articles covered in the previous two lectures will be discussed, and questions about methodological approaches can be raised.

Credits: 3-0

Class Session: 3:00-4:20 PM (includes 5 min. break)
Room 247 Plant Biology Building

Web Site: https://d2l.msu.edu
Use your MSU userID and password (case-sensitive) to log in.

Format/Daily Preparation: Sessions of the class typically will consist of lectures by the faculty combined with a discussion of assigned readings. For each week, two to four key papers will be posted as .pdf files at the D2L web site, by the previous Friday. The faculty will provide lecture notes by or soon after lecture time, by providing access to PowerPoint slides through D2L. These notes will provide copies of some of the figures and tables that may be mentioned from articles other than those which were among the assigned readings. ***All of the assigned papers should be read for learning about the lecture topic prior to class.*** However, ten times during the semester one paper will be designated for thorough understanding and in-depth discussion in one of the lectures of the week (TBA – see the reading list associated with each lecture). During most weeks that article will also be the source of a brief in-class quiz. Students should prepare by making sure that they can answer the following:

1. What was the goal of the research, including the problem being addressed?
2. Which figure(s) presents the most critical data in the study? Why?
3. What were the strengths and weaknesses of the paper?
4. What would *you* do next?

Other Recommended Activities: Throughout the semester, several seminar series will be hosting

scientists who will present lectures on pertinent topics. Some may be mentioned in class, and posted on the D2L site. We encourage you to mention seminars in class so that other students may learn of them.

Course Grade: The grade will be based on two exams (60% of grade total; split between midterm and final according to the number of class periods devoted to each) and a research proposal (30% total). The remaining 10% of the final grade will be based on the out-of-class assignments, quizzes (lowest grade eliminated from grading), involvement in discussion of the assigned articles and general class participation.

Exams: Copies of the midterm and final exam will be given to students at the end of the class period indicated on the schedule ***(3 March; covering all material through the end of the 1 March lecture, 28 April; covering the remaining lectures)***. The two exams will have an open-book, take-home format (notes, books, and articles may be consulted, but students are expected to complete their exams independently, without discussion with others until after all exams are turned in). The exams are due *by 5 pm* on the following day. Hard copy of the mid-term exam should be given to Rob Last in BMB 301a or left in his personal mailbox on the second floor of the Biochemistry Building (not in the lab group mailbox, please), and the final exam should be turned in Sheng Yang He's mailbox on the first floor of the Plant Biology Building or in person on the fourth floor of the Molecular Plant Sciences Building).

Written Assignment Two hard copies due to Matt Bedewitz before 5 PM **on 22 March.**
Your assignment is to write an original research proposal on some aspect of plant molecular biology/molecular genetics. It does not have to be on a topic specifically covered in class, ***but should focus on the molecular biology/molecular genetics aspects of the problem you choose to address*** (as opposed to the biochemistry, quantitative genetics, molecular breeding or physiology of the problem). It should also be a basic biology problem, though it could have translational possibilities. For instance, you could write a proposal relating to the regulation of gene expression; mechanisms of plant disease resistance; molecular genetics of plant development; molecular responses to the environment (e.g., light, temperature, water, UV); etc. The only other limitation is that the proposal should NOT be directly related to the research project you are conducting for your graduate degree, are likely to perform as a student, or were involved in the past. If you would happen to be working on regulation of gene expression in response to low temperature, you should not write a proposal on this topic. You could, however, write a proposal on ABA-regulated gene expression/signal transduction or, of course, any of the other topics. You are strongly encouraged to start researching your topic as soon as the course begins, including discussions with R. Last before and after class times. Drs. Last and Takahashi will be available for detailed discussions about your topic choice on 10 and 11 February.

The general format of the proposal should be as follows (page numbers refer to single spaced pages using a standard 'with serif' 11-12 pt font; Times New Roman 12 is a good choice):

A. Summary with Specific Aims (1 page max.). State the broad, long-term objectives of the proposed line of research and describe concisely and realistically what the specific research described in the proposal is intended to accomplish. Specific aims can be listed as a short list (typically only 3-4 total).

B. Background and Significance (2 pages max.). Summarize what is known about the chosen area of research critically evaluating the existing knowledge and specifically identifying the gaps the project is intended to fill. State concisely the importance of the research and relate the specific aims to the broad, long-term objectives of the project. Please cite key references in this and the next section, preferably in a "first author, date" style.

C. Experimental Design and Methods (4 pages max.). Outline the experimental design and the procedures to be used to accomplish the specific aims of the project. Include discussion on how you will interpret the data. Discuss the potential difficulties and limitation of the proposed procedures and present alternative approaches to achieve the aims where appropriate. On a separate page (not included in the 4 page max count), give a tentative sequence or timetable for the investigation.

D. References. List the literature cited in the text, including titles and full list of authors.

E. Graduate and Past Research Projects (1 paragraph). Because the proposal should not be directly related to your graduate research project, we ask you to very briefly summarize the research you are conducting for your graduate degree. A research proposal will be written on a topic pertinent to the course. The proposal is expected to be original and creative. Students may not use a paper written for another course, nor conceptualized by someone else.

Oral Presentations: Class periods (currently planned from 24 - 31 March) are reserved for students to give 10 minute presentations describing their research proposals to the rest of the class. The order of the reports will be randomly selected and announced only one day prior to the first lecture date; thus all students should be prepared to speak on 24 March. Electronic slides should be used to aid the presentations. The quality of both the oral presentation and the written report will be considered in assigning a grade to the research proposal.

Course Assessment:
Michigan State University and the instructors takes seriously the opinion of students in the evaluation of the effectiveness of instruction, and MSU has implemented the SIRS (Student Instructional Rating System) process to gather student feedback. This course utilizes the "online SIRS" system. You will receive an e-mail sometime during the last two weeks of class asking you to fill out the SIRS online form at your convenience. Please note the final grade for this course will not be accessible on STUINFO during the week following the submission of grades for this course unless the SIRS online form has been filled out. You will have the option on the online SIRS form to decline to participate in the evaluation of the course – we hope, however, that you will be willing to give us your frank and constructive feedback so that we may instruct students better in the future.

In addition to the SIRS format, which is focused on specific instructor performance, we may also ask you to provide feedback on the course using a form that we have customized. It will be made available via D2L in such a way that you can provide feedback without us knowing your identity. If you turn in this form you will receive a 10 point 'thank you' bonus towards your final grade.