Course information

Course title: M116L, Molecular biology lab
Credit hours: 5
Lecture times: Tue 5:00-7:50pm (we should be done by ~7pm on most days!)
Location: PSCB 120

Instructor information

Instructor: Dr. Pavan Kadandale
Email (*** IMPORTANT! See email policy guidelines! ***): pavan.k@uci.edu
Office: 2234 McGaugh Hall
Office hours: Tue and Fri, 10:00-11:00am

I hail from India (so, yes, I do have a funny accent! Try and get me to say "aluminium!"), and obtained my PhD at Rutgers University, NJ. I then worked as a post-doc at UCSD before coming to UCI. The most important thing I would like to teach you is to be independent learners. If I can teach you some Molecular biology along the way, that would be a bonus! I see my role as more than just a lecturer, and within the constraints imposed by dealing with ~120 students, TAs and my other committments, I would like to be available to you to address your concerns and discuss ideas about not just the class, but also science and life in general. I do have a wicked sense of humor, but hope that won't dissuade you from coming to office hours, and otherwise interacting with me. If you see me around campus, on the beach, on some hiking trail, or at Café 85C, do say hello! That being said, I do have numerous engagements that take up my time, so if you drop in to my office unannounced, and I don't have time for you, please don't take it personally. I look forward to our time together this quarter.

Mentoring: I try and make a lot of time to mentor students, and hope you will take advantage of this. You can email me to fix a time to meet over coffee/lunch to talk about anything - careers, my life, your life, dogs, cats, science, etc.

Course description

Over the course of the quarter, you will learn some of the essential techniques that have made many modern biological advances possible. You will also learn how to think about experiments critically and analytically, and how to organize your thoughts and communicate them effectively in writing.

That's a lot to deal with in one quarter. So, make no mistake about it - you will be working hard in this course. There are many quizzes, many lab reports and a few paper readings to deal with. But hey, no pain, no gain, right? I think this will be an enjoyable course as long as you work regularly and keep up with the writing. Be warned that this is not a course where you can cram at the eleventh hour and expect to do well. There's not a huge amount of material to memorize (Bio98, I'm looking at you!), but there's a lot to learn, and lots to do.

So put on your lab coats, and your close-toed shoes and let's get this party started.
Academic dishonesty

In two words, DON'T CHEAT. In any form or fashion. Do not copy exam answers. Do not plagiarize. Do not aid or abet cheating in any way. If you are ever in doubt about whether something constitutes cheating and/or plagiarism, come check with me or your TA BEFORE you decide on a course of action. Once you are caught (and trust me – you will be!), I will accept no excuses. None. Under any circumstances. We will be taking academic integrity VERY seriously. The UCI policies on Academic Honesty are laid out at http://www.editor.uci.edu/11-12/appx/appx.2.htm.

You will be performing your experiments in a small group, but your lab reports, quizzes and assignments have YOUR name on them, not your group’s. Which means all that work must be your INDEPENDENT effort. Plagiarizing from your lab partner is still plagiarism, will be treated as such, and will result in the harshest penalties applicable. It is expected that you will complete all assignments, even if they are not graded, and in keeping with the guidelines stated for each assignment. Violations of the university's policies on academic honesty will result, AT THE VERY LEAST in an "F" in the course.

So, read my lips. DO NOT CHEAT.

Say it with me. DO NOT CHEAT.

Course goals

This course is designed to introduce you to the world of DNA & RNA manipulations. In this course, you will be exposed to some of the basic experimental techniques used in labs all over the world to work with DNA and RNA, and which are fundamental to some of the most important discoveries in biology. You will learn how genes of interest can be isolated, amplified and transferred from one organism to another, and the practical uses of such procedures. You will also learn how to work with RNA, and will be performing a real research project, and you might very well become the first person to discover something new about a microRNA involved in cancer. Extensions of the techniques that you learn in this class are being used in modern, cutting edge research ranging from stem cell therapies, to creating synthetic life forms.

A second goal of this course is to teach you to think and write scientifically. Regular lab report writing will be required in this class, and will train you to think deeply about the purpose of doing a particular experiment, experimental procedures, experimental design, and the interpretation of experimental results. You should also become adept at organizing these thoughts into a coherent story and communicating your findings to an audience of your peers via your written lab reports.

It is our hope that the combination of learning to do experiments, to think critically about experimental procedures, troubleshoot experiments, and carefully analyze data, will stand you in good stead irrespective of your final career path.

Attendance

Attendance at all lecture and lab sections is mandatory. There are NO make-up labs, no make-up theory quizzes, no make-up pre-lab quizzes, and no make-up final. This is a lab course, and its success depends largely on your active and responsible participation. You are expected to read the lab manual thoroughly and carefully prior to each lab section, so that you already have a plan of action before stepping into the lab.
Lab Manual

The lab manual is supplied as a pdf file on the class website. It is your responsibility to download and bring the lab manual to ALL lab periods. Use lab manuals from previous classes at your own risk. The information & policies for the lab change from quarter to quarter, and if you have an older lab manual, you will be responsible for knowing the differences.

Please have the manual with you for the first lab session. Please make sure it is printed out; phones, iPads, eReaders and tablets are NOT conducive to working in the lab environment. You are expected to read the lab manual each week BEFORE coming to lab.

Quizzes, paper readings, lab reports, final exam & Grades

Summary (actual scores will be normalized to these values)

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory quizzes</td>
<td>200</td>
</tr>
<tr>
<td>Lab points</td>
<td>250</td>
</tr>
<tr>
<td>Lab reports</td>
<td>300</td>
</tr>
<tr>
<td>Paper reading</td>
<td>250</td>
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<tr>
<td>Final exam</td>
<td>200</td>
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<tr>
<td>Final lab report</td>
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Theory quizzes

There will be a quiz prior to each lecture. These quizzes will test your theoretical understanding of what has been discussed in previous lectures. You may be required to use concepts learned in multiple lectures to successfully answer questions. The quizzes will start promptly at the beginning of class, and will end at the indicated time for each quiz. If you are late, no extra time will be given. If you miss the quiz, you will get a "0" score for that quiz. There will be NO make-up quizzes. Your worst score will be dropped in calculating your final theory quiz score.

Paper reading assignments will NOT be tested in these quizzes.

These quizzes will be open book/notes (but no electronics).

Lab points

Lab points will consist of four things:

1. **TA Points (50)**
   These will be assigned by your TA, and are based on your performance in lab. TAs will be taking away points for egregious offenses, such as not cleaning up after yourself, ruining someone else’s experiments, etc. You will not be penalized for honest mistakes, though some points may be taken off for experiments that do not work due to user error.

2. **Clicker participation (25)**
   In each lecture, you will be required to participate in iClicker questions. **DO NOT FORGET** to bring your clickers with you to every lecture class. You will receive full credit (see exception below) as long as you have participated (regardless of number of correct answers) in at least 70% of the questions. You are responsible for the proper registration of your iClicker, and
for making sure that your iClicker is present and working for each class. I will entertain no excuses regarding your iClicker. If you miss a class, you miss the iClicker participation for that class. If your iClicker runs out of batteries during class, and you don’t have spares, you will miss the iClicker participation for that class. If your dog ate your iClicker, and you didn’t have time to go buy a new one before class, you will miss the iClicker participation for that class. I understand that life happens, and that is why you only need 70% participation in the iClickers to get full credit. You need to have participated in at least 70% of classes to get your full iClicker points.

**EXCEPTION:** If you clicked on a non-valid response (for example, a question has 4 possible answers, A-D. However, you click on "E"), you will get 1 point taken off for each invalid response. This means that if you have more than 5 invalid responses, you will get negative points!

3. **Plasmid worksheet**

At the beginning of lab 8, you will need to hand in your completed plasmid worksheets. These are self-explanatory, and will be based on labs 5 and 6.

4. **Weekly lab notebook check**

**BEFORE** you step into lab and start your experiments, you **MUST** hand in your lab notebook checklist to your TA. You must also have an identical copy of this checklist in your lab notebook. The exact mechanism by which you accomplish this is up to you (Examples include printing out two copies, using a carbon-copy notebook, etc.). Your TA will **ONLY** accept your checklist within the first two minutes of each lab session. You must hand in your checklist **personally** (this means no asking you lab partner/friend/mom/girlfriend/boyfriend/cat/dog/etc.) to your TA before each lab session. You will get points for completeness and thoroughness of your checklist.

**AFTER** each lab session, and before you leave the lab, you **MUST** show your TA your lab notebook to show that you have checked off each item in your checklist. Again, this will be checked for completeness and thoroughness.

**Please refer to the “Lab notebook checklist” document for more information on what must be included in your checklist, and what is expect of you for this.**

**Lab reports**

**Lab report 1:** Due in Turnitin.com before Lab 3. **Report on the VNTR identification.**

You will have to submit your reviews of TWO other lab reports, plus a self-review of your own report by the date shown on the calendar.

You will then modify your lab report based on the feedback you get from your peers, as well as your own reflection on your lab report, and hand in a final version that will be graded by the TAs (see calendar).

**Lab report 2:** Due in Turnitin.com before Lab 5. **Report on the effect of your tested variable on RE digestion.**

You will have to submit your reviews of TWO other lab reports, plus a self-review of your own report by the date shown on the calendar.

You will then modify your lab report based on the feedback you get from your peers, as well as your own reflection on your lab report, and hand in a final version that will be graded by the TAs (see calendar).

**Lab report 3:** Due in Turnitin.com before Lab 7. **Report on Lab 4, testing the effects of methylation on RE digestion.**

You will have to submit your reviews of TWO other lab reports, plus a self-review of your own report by the date shown on the calendar.

You will then modify your lab report based on the feedback you get from your peers, as well as your own reflection on your lab report, and hand in a final version that will be graded by the TAs (see calendar).

**Peer reviews:** You will be required to evaluate two peer assignments for Lab Report 1-3. You will only provide comments on how the assignments can be improved, and you will not be grading them. You will get completion points for submitting your reviews on time.
NOTE: ALL final lab reports MUST have the lab report cover page attached to it.

NOTE: Failure to turn in ALL lab reports & assignments will result in an "F" in the course. Turning in a lab report late will result in the penalties outlined in the Lab Report Guidelines section. Failure to turn in COMPLETE drafts for each lab report (for the peer review assignments) will also result in automatic "F" in the course.

Why so much writing & reviewing?
Remember that one of the goals of this course is to improve your writing skills. You can only develop writing skills by practice & by reflecting on what makes a "well written" assignment. The more you write, and the more you think about how to write well, the better you will be at it. Or at least, that's the theory.

Paper reading
You will be required to critically read and understand three scientific papers that will be assigned during the course. You will be required to submit two written assignments based on the first two papers (see below). We will subsequently discuss the papers in class to facilitate your understanding of how to read scientific papers.

1. Paper reading assignments
   There will be two written assignments based on reading scientific papers. These will be due in Turnitin.com on the dates shown on the calendar.

2. Paper Exam
   The third paper will NOT be discussed in class. There will be a quiz based on the third paper (and ONLY the third) in class on the date indicated on the calendar. You can print out and bring the paper with you to class and refer to it during the quiz (in fact, you should!).

   The paper reading quiz will be open book/notes (but no electronics).

Final exam
The final exam will be administered at the final weekly lecture. The weekly quizzes (theory & lab) are good preparation for the final. The final will be cumulative, and will include everything discussed in lectures and labs (the paper reading assignments will NOT be included).

   The final exam will be open book/notes (but no electronics, except dedicated calculators).

Final lab report
The final lab report will be due as shown on the calendar. The final lab report will consist of the entirety of experiments from Labs 7 to 9. You will detail how you selected a candidate gene, how you designed primers for it, the RNA isolation, RT-PCR, and finally quantification of gene expression by qPCR. The final lab report will be due in Turnitin.com per the date shown on the calendar.
Regrades

The regrade policy is only in place so you don't pay the price for human error. Please do not use the regrade policy as a means to try and secure a few extra points. It will not work, and eventually will prove to be counterproductive. Trust me, I or the TA might regrade your ENTIRE quiz when you submit your regrade request.

If you believe that there is an error with your grade in the weekly quizzes/pre-lab quizzes, please email your TA with details on what you think the error was, and why you think you deserve more points. You should email your TA within 2 days of receiving your exam back. Merely sending an email saying you think you should get full points on a particular question will result in your email being ignored, and no regrade. The email should detail why you think you deserve more points than was originally given. See the examples below:

Example email 1:

Dear TA,
I think I should get 5 points for question 2. Please make the correction in my grade.

-Student "I did not read the regrade policies carefully"

Result of this email: Ignored, no regrade

Example email 2:

Dear TA,
I believe I should get 5 points for question 2 for the theory quiz #5. The answer I gave was that the band would be at 1.5kb, whereas the correct answer as discussed in class was 1564 bp. I was merely rounding off in my answer, and the fact that my reasoning matches what was discussed in class shows that I completely understood the question, and answered it correctly. Thus, I think I deserve the full 5 points for this question.

-Student "I read the regrade policies"

Result of this email: TA will consider the regrade request

If you believe that there is an error with your grade in the FINAL EXAM, please email me with details on what you think the error was, and why you think you deserve more points. You should email me within 2 days of receiving your exam back (or by the time specified in any emails I send you after the Final). Merely sending an email saying you think you should get full points on a particular question will result in your email being ignored, and no regrade. The email should detail why you think you deserve more points than was originally given. See the examples above.

NOTE: If you get into a pissing match with your TA, you will be referred to me. You will lose any pissing match with me. On the miniscule chance that I think your point is valid, I might consent to regrading your quiz.
Email policy

- First post all questions (unless they are of a personal nature) on the Message Board. Other students, or the TAs might give you a more prompt answer. I will not respond to emails of a non-personal nature, but will answer questions on the Message Board.

- You may get a quicker response to your question on the Message Board. Remember that I or the TAs will be checking the Message Boards, and will highlight the good answers to questions. Also search the Message Boards; your question might have already been asked and answered!

- Examples of emails I will not answer:
  An email asking me to explain how an RE generates a 5' overhang.
  An email asking for the correct answer to question 3 on Quiz 4.
  An email asking when Lab report 4 is due.

- Examples of emails I will answer:
  An email asking for a make up final exam because you were involved in an accident on the day of the final.
  An email asking to meet with me outside of office hours for a personal matter.
  An email telling me about an incident of cheating/harassment/favoritism in class.

- All emails should contain the following in the subject line:
  [M116L-Spring 2015]-
  Include the square brackets.

- After that, have a short subject for the email. Your subject line should look like this:
  [M116L-Spring 2015]-Subject of email

- I will reply to email message as soon as I can, but it may take up to 48 hours. This means that if you email me a question one day before a quiz/exam/lab report submission, you may not hear back from me in time.

- I will not reply to your questions if the answer is to be found in the lab manual or website. Or if it is information that I have previously emailed you.

IF YOU DO NOT FOLLOW THESE INSTRUCTIONS CAREFULLY, YOUR EMAIL WILL END UP IN MY SPAM FOLDER AND WILL NOT BE ANSWERED. EVER.
Discussion board participation

Active participation in the discussion board is not only a great learning tool, but might also result in some extra credit.

*What is this “credit for participation” you ask?*

Well, at the end of the quarter, I might give people who made excellent contributions in the Discussion board some extra credit. But because I don't want people spamming the boards in anticipation of extra credit, I will leave the specifics nebulous for now. The precise nature of the extra credit will be explained at the end of the quarter.

The question uppermost in your mind is going to be why the bloody hell you should participate in the forums. Some of the advantages are:

**Improve your learning!**

Asking and answering questions is the BEST way to really start thinking about the material and gauge your own understanding of all the topics we are going to cover. Some of you will argue that since the class is graded, it makes no sense to share your wisdom with your fellow classmates. This is a silly argument, since explaining what you think you know will increase your own understanding, sometimes show you how wrong your “understanding” was, and will almost always end up improving your grade. In my classes, students who actively participated in the forums (and I mean in an effective way – not just to post useless comments!) usually ended up with an “A” in the class.

**Have fun!**

One of the most important ways to increase your grade in the class is to get interested in the subject matter. And one of the most effective ways to do that is to talk with other people about what you are learning in class and how it applies to your life. And one place to discuss that is in the forums. Having a common subject to talk about also builds a sense of community, which makes class a lot more fun and engaging.

**Give useful feedback about class!**

One of the annoying things about the current system of class evaluations is that I get to know what you thought about the class at the end, when it does you no good. Instead, we can have a meaningful discussion in the forums during class on things that can be done to improve class while the quarter is still in session, so that you can benefit from the feedback too. It also helps me know when there is a problem that is shared by many people that needs to be fixed, as opposed to assuming that a problem is just one whiny student who emailed me!
FAQs

Will the lectures be podcast?
Yes.

Can I meet with you out of office hours?
Yes, subject to time constraints. Also, these appointments are exceptions, rather than the rule. You can email me to set up a mutually acceptable time for meeting outside of office hours.

How can I do well in this class? How can I get an “A”?
Don't just study the material. Learn it.
Don't just study the material. Understand it.
Don't just study the material. Think about it.
Don't just study the material. Apply it.
Don't just study the material. Integrate it.
Keep up with the readings, and lab report writing.

Is “X” important to know? Will “X” be on the exam?
Yes.

Can I ask you about science, careers, life, etc.?
Yes. I am happy to meet with you over lunch/coffee (subject to time constraints) to talk about my thoughts and life experiences. You can email me throughout the quarter to fix a time to meet. Please be aware that I might invite other students to join our discussions.