Life Sciences 187A: Principles and Practices of Genomic Research
(4 credits)

Winter 2008 Syllabus

This course is designed for undergraduate students interested in research. This course has three hours of Lab meetings and lecture per week and a six hours of laboratory research each week.

INSTRUCTOR: Gaston M.U. Pfluegl (drpfluegl@gmail.com)
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COURSE ADMINISTRATOR: Lily Yanez (lyanez@lifesci.ucla.edu)
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LECTURE & LAB MEETINGS:

M	3:00 pm – 4:00 pm (Lecture)	La Kretz 100
W	3:00 pm – 4:00 pm (Presentation)	La Kretz 100
F	3:00 pm – 4:00 pm (Lab Meetings)	La Kretz 100

LABORATORY RESEARCH: TR or WF 8:00am – 12:00pm (6 hours max)
3336 Young Hall South
(310) 825-0171

URI website: www.lsic.ucla.edu/ugri/
Course website: www.lsic.ucla.edu/classes/winter2008/
Lab website: http://lslab.lscore.ucla.edu/

RESEARCH PROJECT.

Life Sciences 187 offers you the opportunity to participate in research in microbrial and mouse genomics by a.) sequencing the genome of *Ammonifex degensii*, a thermophilic bacterium and b) by genotyping genotypic variations of six homozygous mouse strains by using microsatelitte.. As student researchers, you will be members of the UCLA Undergraduate Genomics Research Initiative (UGRI), a precedent-setting undergraduate education in which students conduct cutting-edge research in genomic biology and biotechnology. UGRI is a collaborative, cross-disciplinary effort among undergraduates in lower and upper division life science courses. The UGRI intends to be the first group of undergraduates to produce an annotated microbial genome. For regular updates of our activities, link to www.lsic.ucla.edu/ugri/

RESEARCH REQUIREMENTS.

LS187A students must conduct six hours of laboratory research per week. In addition, students are required to attend weekly lectures on Mondays from 3-4PM in La Kretz 100 and group meetings on principles and techniques held at 3-4 PM on Wednesdays and Fridays in La Kretz 100. Teamwork is essential for a successful genotyping project. Accordingly you are expected to be professional, punctual, observant and alert to the day's activities, and willing to collaborate with your fellow researchers.

RESEARCH MATERIALS

- White lab coat worn at all times in lab
- Lab notebook (any 8 × 11 bound type, college ruled) – you do NOT need the carbon paper type
- Download assigned readings and protocols from course website

IMPORTANT LAB RULES:

- Lab computers and printers may not be used for personal purposes
- No open toed shoes (i.e., no flip-flops, sandals, or bare feet)
- Punctuality is essential

LECTURES, LAB MEETINGS and LABORATORY RESEARCH

Lectures (M 3-4 PM, La Kretz 100). We discuss sequencing theory and practice. Please complete assigned readings prior to lecture. PowerPoint slides can be downloaded from the course website.

Lab Meetings (WF 3-4, La Kretz 100). These are an important part of research: it's an opportunity to discuss findings and troubleshoot problems. As a group we also discuss theory, practice and our results. Please note that there will be five *unannounced* quizzes given at the beginning of the Wednesday lab meetings.

Laboratory Research (TR or WF, 8AM – 12PM, 3336 YHS). This is when your research will be conducted, which primarily consists of sequencing and preliminary annotation of *A. degensii's* genome.

GRADING

	Pts	%
Conduct and Initiative (50 pts each) ……..….	100	20%
Quizzes (5 at 20 pts each) ……..…	100	20%
Midterm ……..……	100	20%
Final Exam ……...……..……	100	20%
Open Seminar Report ……...…....…..……..	50	10%
Lab Notebook ……..…...	50	10%
Total Points	500	100%

Attendance at Monday and Wednesday lab meetings (2 hrs/wk) and fulfillment of the required weekly research hours (6 hrs/wk) are both **MANDATORY** – unexcused absences from any of the foregoing shall result in a **demerit**. (Excused absences will be given for extenuating circumstances such medical reasons, bereavement, MCAT testing, med school interviews, etc.) Demerits will result from behavior such as (without limitation): carelessly breaking equipment; repeated incorrect analyses of data despite instruction and/or mentoring; uncooperativeness; excessive tardiness; and/or unexcused absences. You will be notified if you incur a demerit.

Grades will be assigned by point totals: A, > 90%; B, >80% etc., and determined by the Instructor. Any You will be notified of any demerits you incur. Demerits will lower your grade.

Students are expected to be aware of the University of California policy on academic integrity pursuant to the UCLA Student Conduct Code (www.deanofstudents.ucla.edu). Please review sections on (1) plagiarism, (2) cheating and (3) use of unauthorized study aids. Violations are promptly referred to the Dean of Students. Penalties for violation are quite severe, will become a permanent part of your academic record, and will likely preclude entry to any graduate or professional school worth attending.

INITIATIVE

By enrolling in the course you have taken the initiative through research in a relatively unstructured setting. As for any research scientist, this opportunity is what you make of it. Thus you begin the quarter with 50 points for initiative. If the teaching team observes that you make poor use of your laboratory time or computer laboratory time, your 50 initiative points will be docked incrementally. Our progress depends on the quality and quantity of everyone's contribution.

LAB NOTEBOOK

You will log your observations, findings, results of experiments, changes to protocol, formulas, and unusual and pertinent findings or observations in your lab notebook. You do not need to restate the protocol. Your lab notebooks will be checked periodically during the quarter. Your lab notebook may not leave the laboratory and thus must be updated in lab.

SEMINAR REPORT

An important aspect of scientific research is your ability to effectively communicate your results. You are expected to write a one page summary of a seminar you attend at UCLA (see "Events in Molecular Biology" link at course website). This is due no later than 12:00 noon on **Feb 22, 2007.**

QUIZZES AND EXAMS

Quizzes will relate to the preceding Friday lecture and any assigned reading, including articles. Quizzes are approximately 20 minutes long and are taken by all students at the beginning of Wednesday meetings. No extra time given for tardiness. Each quiz is worth 20 points, and is UNANNOUNCED. The midterm is scheduled for **Friday Feb 8, 2007** and the comprehensive final exam is on **Wednesday March 19, 2007.**

PRESENTATIONS DURING LAB MEETINGS

Presentations are an integral part of the research learning experience. Each research group will be required to give a presentation during the quarter (see schedule and your group assignment). PowerPoint presentations are to be 25 minutes in length (inclusive of Q & A). Your presentation must be reviewed by the Instructional Team PRIOR to presentation, so please make advance arrangements.

		LS187A Winter 2008			**Dr. Pfluegl**			
		Lecture	**M**	**3 - 4 pm LaKretz 100**				
		Lab Presentations	**W/F**	**3 - 4 pm LaKretz 100**				
		Lab Meeting	**W**	**3 - 4 pm LaKretz 100**				
Week	Lab Topic	Lecture Topic	Mo	Tu	We	Th	Fr	Presentation
				ABCDE	FGHIJ	ABCDE	FGHIJ	Topic
1			7-Jan	8-Jan	9-Jan	10-Jan	11-Jan	
				Train	Train	Train	Train	
	Train	Intro	Lec 1		LabMeet		Lec 2	Ammonifex
2			14-Jan	15-Jan	16-Jan	17-Jan	18-Jan	
				AB1	FG1	CD1	HI1	
	Miniprep	Sequencing	Lec 3		LabMeet			
3			21-Jan	22-Jan	23-Jan	24-Jan	25-Jan	
			Holiday	E1	J1	ABLicor	FGLicor	
	PCR				LabMeet		Lec 4	Technology
4			28-Jan	29-Jan	30-Jan	31-Jan	1-Feb	
		Blast	Lec 5	CDLicor	HILicor	AB6	FG6	
	GEL				Present A		Present F	Miniprep
5			4-Feb	5-Feb	6-Feb	7-Feb	8-Feb	
	Blast	Genetics	Lec 6	AB1 CD6	FG1 HI6	CD1 E6	HI1 J6	
	SNPs				LabMeet		**Midterm**	
6			11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	
		Mouse genetics	Lec 7	E1	J1	AB4	FG4	
	MS				Present B			Restriction digest
7			18-Feb	19-Feb	20-Feb	21-Feb	22-Feb	
			Holiday	CD4	HI4	AB6	FG6	
	MS				Present G		Present C	Agarose/Li-cor gel
8			25-Feb	26-Feb	27-Feb	28-Feb	29-Feb	
		TBA	Lec 8	AB1 CD6	FG1 HI6	CD1 E6	HI1 J6	
	SNPs				Present H		Present D	Li-cor gel/Blast
9			3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	
				E1	J1	AB4	FG4	
	SNPs	Annotation	Lec 9		Present I		Present E	Mouse Genomics
10			10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	
				CD4	HI4	AB6	FG6	
	SNPs	Summary	Lec 10		Present J			Mouse Genomics
Finals			17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	
					Final			