Biology 498

Peer mentoring of undergraduate research: Construction of yellow fluorescent protein reporter genes.

Instructor Information:

Instructor	Dr. Kristopher Blee
Office	Holt 301H
Office hours	
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Course Description

This course provides upper division biology majors with the opportunity to serve as peer mentors to lower classmates in the undergraduate research laboratory. The students enrolled in Biology 498 will attend weekly Biology 151 laboratory instructors meetings and a Biology 151 lab section. For the first third of the semester Biology 498 students will shadow their respective Biology 151 laboratory instructor and provide instruction on the use of micropipettes to the class. During the second third of the semester Biology 498 students will assist the Biology 151 lab instructor with the hands-on instruction of spectrophotometer use and spreadsheet manipulation of data. In the final third of the semester Biology 498 students formally introduce the Biology 151 cap stone experience, use of recombinant DNA technology to generate yellow fluorescent protein reporter genes. This line of research in continued in Biology 409. Upper division Biology majors are uniquely qualified for this opportunity after completing Biology 409 where they have completed an extension of the Biology 151 research experience. Here they will be using their research experience in the peer mentoring of lower classmates in similar research. The mentored Biology 151 students will benefit from the additional attention their peers can provide, strengthening their current and future research efforts. Providing the mentoring experiences reinforces learning and boosts attitudes towards science.

Course Assignments:

1. Attendance. Attendance is mandatory Aug 21, Dec 18, at all Friday Biology 151 laboratory instructor (T/A) meetings, and at respective assigned Biology 151 lab sections (see below). Failure to meet attendance requirements can result in a no credit (NC) grade for the course. An unavoidable absence can be made up only by participation in another Biology 151 lab section from the same week.

2. Biology 151 laboratory section assignments. Each student is assigned a Biology 151 lab section from the list below to assist with.

a. Laboratory section schedule for Fall 2009
   i. Tuesday
      1. 8 to 10:50 section 02
      2. 11 to 1:50 section 03
      3. 2 to 4:50 section 04
      4. 5 to 7:50 section 05
   ii. Wednesday
      1. 8 to 10:50 section 06
      2. 11 to 1:50 section 07
      3. 5 to 7:50 section 08
   iii. Thursday
      1. 8 to 10:50 section 09
      2. 11 to 1:50 section 10
      3. 2 to 4:50 section 11

3. Mentoring assignments. Each week, Biology 498 students are expected to actively mentor students of their assigned Biology 151 laboratory to facilitate learning and completion of laboratory experiments by the Biology 151 students. For their efforts Biology 498 mentors will earn Credit (CR) or No Credit (NC) scores. To earn a CR, students will have demonstrated successful Biology 151 lab course goal oriented interactions with Biology 151 students, during the scheduled lab period.

4. Course grading. Students earning 10 or more CR scores on assignments listed on the "Course Assignments Summary" below will earn a CR for the course.

Course Assignments Summary	Assignment Grade (CR or NC)	Course Grade (CR or NC)
1 Micropipette demonstration		CR grade requires a CR on 14 or more assignments from those listed at left
2 Assisted students with spectrophotometers		
3 Assisted students with spreadsheet software		
4 Assisted students with protein assay		
5 Assisted students with citrate synthase assay		
6 Research project introduction		
7 Assisted students with Genevestigator		
8 Assisted students with TAIR sequence viewer		
9 Assisted students with IDT DNA Oligo-Tools		
10 Assisted students with PCR		
11 Assisted students with gel electrophoresis and staining		
12 Assisted DNA recovery, calc of equamolar ratios		
13 Assisted students with gel figure preparation		
14 Attendance (perfect attendance required to receive P)		
15 Assisted instructor with signing lab NB weekly checks		
16 Assisted instructor with lab NB grading		
17 Completed end of semester online quiz/survey		

Course Policies:

1. Dropping. You may drop this course during the first 2 weeks by TRACS, and during the 3rd and 4th weeks with a drop card signed by the instructor. After the Census Date of the 4th week, a drop requires a "serious and compelling" reason. Therefore, before you request a late drop for this class, obtain written documentation of your reason for withdrawal. I will not consider any late drop without professional (Ex. Physician) verification of "serious and compelling" reason.

2. Students with disabilities. Additional efforts can be made to increase access of course materials for students with permanent and temporary disabilities. If you are disabled contact CSU Chico Disability Support Services (www.csuchico.edu/dss/index.shtml or University Center Room 100 or 898-5959) for help and notify your instructor as soon as possible.

Biology 498 Fall 2009 Course Schedule				
wk	**date**	**mentor activities**	**scheduled Biology 151 lab topic**	**mentor assignment**
	Aug 21			1st organizational meeting
1	Aug24 Aug25 Aug26 Aug27 Aug28	I Mentor introduction, pipette demonstration	Photosynthesis	Introduction Micropipette demonstration, Pipette patrol
2	Aug31 Sep1 Sep2 Sep3 Sep4		Protein assay	Assistance with protein assay and spectrophotometers
3	**Sep7** Sep8 Sep9 Sep10 Sep11	II Lab instructor shadowing, instructional assistance with spectrophotometers and spreadsheet program	CSU CHICO ADMIN FURLOUGH NO LABS	NONE
4	Sep14 Sep15 Sep16 Sep17 Sep18		Standard curves	Assistance with spreadsheets and graphing
5	Sep21 Sep22 Sep23 Sep24 Sep25		Enzyme assay	Assist with dilutions, citrate synthase assay, and spectrophotometers
6	Sep28 Sep29 Sep30 Oct1 Oct2		Specific activity	Assist with spreadsheets and graphing
7	Oct5 Oct6 Oct7 Oct8 Oct9		Genevestigator Meta-Analyzer, TAIR sequence viewer	Introduction to research project, assist with software applications, graphing results
8	Oct12 Oct13 Oct14 Oct15 Oct16		CSU CHICO ADMIN FURLOUGH NO LABS	NONE
9	Oct19 Oct20 Oct21 Oct22 Oct23	III Peer mentoring of student research	Primer design, IDT DNA Oligo-Tools primer analysis, order primers	Assist with primer designing, software applications
10	Oct26 Oct27 Oct28 Oct29 Oct30		Resuspend primers, isolate DNA, setup and start 1st round PCR	Assist with PCR assembly
11	Nov2 Nov3 Nov4 Nov5 Nov6		Prepare and run ethidium and Carolina gels, BLAST to predict PCR product sizes, stain, destain, photograph gels, prepare figures	Assist sample and gel preparation, gel staining, and figure preparation
12	**Nov9-13**		**Nov 11 Veterans Day**	**No labs or T/A meeting**
13	Nov16 Nov17 Nov18 Nov19 Nov20		Cut bands from Carolina Blu gels and recover DNA fragments, photograph/quantify fragments on ethidium gels, begin equamolar ratio calcs	Assist DNA fragment recovery, calculations of equamolar ratios
14	**Nov23-27**		**Thanksgiving Vacation**	**No labs or T/A meeting**
15	Nov30 Dec1 Dec2 Dec3 Dec4		Establish volumes for equamolar ratios of fragments, set up and start TT-PCR, clone YFP for bacterial expression	Assist with equamolar ratio calculations, and YFP cloning
16	Dec7 Dec8 Dec9 Dec10 Dec11		Prepare and run ethidium gel, stain, destain, photograph, prepare figure of gels, observation of YFP expressing bacteria under UV light	Assist sample and gel preparation, gel staining, figure preparation, UV light operation
17	Dec18		**Final Exam is Friday 12-2pm**	Complete online quiz/survey