MCB 170L: Molecular and Cell Biology Lab (4 units)

Summer 2019 (Session A)
Lecture: M-Fri 11am-12pm in TBD
Lab: Tue-Fri 1-4:30pm in 120 LKS or 4047 VLSB

Instructor
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Division within MCB: BBS, CDB and GGD

Course Introduction
This laboratory class is designed for molecular biology, cell biology and genetics majors to give them an overview of techniques and applications done in these three fields.
This is an intense lab class, and you have to be ready to work at a fast pace throughout the 6 weeks span of the course.

Class time
There is one-hour lecture Monday to Friday starting at 11am and ending at 12pm.
The laboratory part of the class is from 1:00 to 4:30 Tuesday to Friday.
You are expected to be present in class and in lab throughout the 6 weeks.

Class preparation
You should purchase a lab manual and a lab notebook. Before each class period, you need to have read the portion of the lab manual corresponding to the day's work and come to class each day with a prepared experimental protocol written in the lab notebook. All the results and conclusions for each experiment have to be recorded. The quality of the lab notebook will be graded each week.

Expectations
Your success in this course depends on your readiness for each class, your participation in lab and your understanding of the material that will be evaluated regularly. The GSI and the instructors will be there to answer questions about experimental approaches and/or understanding of the experiment's principles and/or troubleshooting mistakes in experiments.

Prerequisites: MCB102 or MCB104/140 or MCB 110

Grading:

Categories		Weight	Topics
Exams (50%)	Exam 1 (6/10)	25%	20% for Molecular Biology 5% for Genetics and Genomics
	Exam 2 (6/12)	10%	Cell Biology
	Exam 3 (7/1)	15%	Protein Chemistry
Oral Presentation (15%)	Presentation 1 (6/14)	10%	Cell Biology
	Presentation 2 (7/5)	5%	Protein Chemistry
Worksheet		15%	Genetics and Genomics
Lab Citizenship		20%	

Summer 2019 Experiment Schedule

Class	Date	Day	Molecular Biology	Cell Biology	Protein Chemistry	Genetics & Genomics
	5/27	Mon	Memorial Day Holiday			
LEC 1 LAB 1	5/28	Tu	Lecture: Intro and overview of PCR Lab: Check in; Pipetting & lab habits PCR of CBS			
LEC 2 LAB 2	5/29	Wed	Lecture: The principles of genomic engineering Lab: purification; digest; purification; run gel			Lab: PCR of carotene cassette
LEC 3 LAB 3	5/30	Th	Lecture: CRISPR/Cas9 Lab: ligation & transform DH5α			Lab: run gel; DpnI digest; purification
LEC 4 LAB 4	5/31	Fri	Lecture: Transformation Lab: streak isolates			Lab: induce yeast 4-1, 4-2; transform yeast
LEC 5	6/3	Mon	Lecture: Overview of Genetics			
LEC 6 LAB 5	6/4	Tu		Lecture: Intro to microscope Lab: Cytoskeleton Sample prep		
LEC 7 LAB 6	6/5	Wed		Lecture: Cytoskeleton: actin filaments and microtubules Lab: Cytoskeleton microscopy		Lab: Analyze results (report due)
LEC 8 LAB 7	6/6	Th		Lecture: Chromosome biology Lab: Chromosome biology spreads		
LEC 9 LAB 8	6/7	Fri		Lecture: FISH technique Lab: FISH		
LEC 10	6/10	Mon	Lecture: Overview of Cell Biology			
LEC 11 LAB 9	6/11	Tu		Lecture: Fluorescence microscope Lab: Fluorescence microscopy		
LEC 12 LAB 10	6/12	Wed		Lecture: Protein sorting Lab: Subcellular localization; transfection; microscope practical		
LEC 13 LAB 11	6/13	Th		Lecture: Subcellular localization Lab: Subcellular localization vital stain		
LEC 14 LAB 12	6/14	Fri	Lecture: Intro to plasmid prep Lab: inoculate for minipreps	Presentation 1		Lab: Streak yeast 9292

LEC 15	6/17	Mon	Lecture: Overview of Molecular Biology			
LEC 16 LAB 13	6/18	Tu	Lecture: Expression and characterization of human CBS alleles in yeast Lab: DNA miniprep; digest; run gel			
LEC 17 LAB 14	6/19	Wed			Lecture/Lab: Bradford assay	Lab: Yeast transformation of CBS alleles
LEC 18 LAB 15	6/20	Th			Lecture/Lab: pour gels; label tubes	
LEC 19 LAB 16	6/21	Fri			Lecture/Lab: Cin8 purification	
LEC 20	6/24	Mon	Lecture: Overview of Protein Chemistry			
LEC 21 LAB 17	6/25	Tu			Lecture: The properties of the yeast kinesin Cin8 Lab: Establish E in ATPase assay; kinesin1 assay	Lab: inoc yeast transformants
LEC 22 LAB 18	6/26	Wed			Lecture: ATPase activity assay Lab: ATPase activity assay of purified Cin8	
LEC 23 LAB 19	6/27	Th			Lecture: SDS-PAGE Lab: SDS gels & transfer	Lab: Plating of CBS strains
LEC 24 LAB 20	6/28	Fri			Lecture: Western Lab: finish Western; Temperature dependence ATPase assay (Report due)	
LEC 25	7/1	Mon	Lecture: Course overview			
LEC 26 LAB 21	7/2	Tu			Lecture: Review human gene expression and allele phenotypes measured in yeast	Lab: Analyze results (Report due)
LEC 27 LAB 22	7/3	Wed			Lecture: Review the yeast kinesin Cin8 Lab: NADH-coupled ATPase assays/ inhibitors	
	7/4	Th	Independence Day Holiday			
LEC 28 LAB 23	7/5	Fri			Presentation 2	