Fall Semester, 2017 - Syllabus for BMB 472:

Experiments in Molecular Biology: Biochemical Applications

Course Objective: To prepare students for future careers in modern biological research.

Instructors:

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Text: Experiments in Molecular Biology: Biochemical Applications
Authors: Dr. Zachary Burton and Dr. Jon Kaguni

The textbook and lab manual (coursepack) can be purchased from the bookstore

Lectures: Monday, 12:40 to 1:30 p.m., 101 Biochemistry

Laboratory Periods: Tuesday - Thursday (Sections 1-3): 12:40 to 5:30 p.m
All sections meet in 111 Biochemistry at 12:40 p.m. each lab day for pre-lab. Laboratory is in 113/117 BCH

Grade in BMB 472

Exams	2 x 100 points	200 points
Lab Notebooks	26 x 10-20 points	~400 points
Quizzes (LON-CAPA)	~13 x 8 points	~100 points
Success of Experiments	~25 x 5-10 points	~160 points
Laboratory Report	1 x 200 points	200 points
Computer Modules (LON-CAPA)	~13 x 3 points	~40 points
Total		**many points**

Students earning 90% or more of the total points will receive a grade of 4.0. The dividing line between 2.5 and 2.0 grades will be approximately 70% of the total points. The range between 70% and 90% will be divided into approximately equal parts for assigning grades of 2.5, 3.0, and 3.5. The dividing line between 1.0 and 0.0 grades will be about 50%.

Late Penalties and Student Responsibilities

1. The late penalty for notebooks is 15 points per day (including weekends). The late penalty for laboratory reports is 50 points per day (including weekends). Final notebook assignment is due at the beginning of the Final Exam; if not submitted at that time it must be handed in before the end of finals week to be evaluated.
2. Pre-lab Quizzes and Learning Modules are accessed through LON-CAPA. Quizzes are due by 12:40 p.m. of your lab day (Tue - Thur). Learning Module answers are due by 12:40 p.m. on the Monday indicated on the schedule. No late Quizzes or Learning Modules will be accepted.
3. Absence from a laboratory session must be documented in writing and, if possible, in advance. Medical excuses will be accepted up to 3 days after the missed class period. Other excuses must be authorized in advance by the instructor.
4. Unexcused absences will result in a penalty of 10 points with additional points lost for missing the TA initials for the pre-laboratory notebook write-up. No success of experiment points will be awarded for **any** missed lab period.
5. Students with 3 or more unexcused absences from laboratory periods will be assigned a failing grade (0.0) in the course.
6. Failure to turn an acceptable laboratory report will result in a failing grade in the course (0.0). To receive a grade in the course (above 0.0), laboratory reports must be handed in, even if the report is so late it does not receive a score.
7. Do your own work. Graphs, figures, or text that are equivalent between laboratory partners or others in the class will not be evaluated for either individual (grade of 0.0). No points will be given for such submissions for laboratory notebooks, homework or laboratory reports. Feel free to work together and collaborate with fellow students, but do not plagiarize or allow your work to be plagiarized. Do not submit the work of others as your own or allow others to directly reproduce your work.

Assignments:

1. **Laboratory Notebooks**. Instructions for maintaining laboratory notebooks are in your textbook/coursepack (pp. 8-9). Read the protocol for each experiment and prepare a detailed pre-lab write up in your notebook before coming to each lab. As soon as your experimental data are available, complete your laboratory write up so that you can ask questions about aspects of the experiment that you do not fully understand. The laboratory notebooks are collected frequently during the term to encourage best laboratory record keeping. Proper maintenance of a laboratory notebook is a primary key to a professional career in science. Notebooks may be purchased at the University Stores Counter on Service Road. The catalog number is: 14042680 and the price is ~ $13.00 plus tax.
2. **Laboratory Report**. Instructions for preparation of the laboratory report are in your textbook/coursepack (pgs. 10-11). Additional information will be provided as the due date approaches.
3. **Quizzes and Computer Learning Modules**. A set of pre-lab Quizzes and directed computer learning modules are available to test your level of preparation for the lab period and to supplement reading, lectures and class notes. These modules may be accessed through LON-CAPA**.**
4. **Class Data**. Class data, when needed, will be available on Desire2Learn (D2L). If your research team fails to produce interpretable data for an experiment, use the data from another team to complete your laboratory write up. Give appropriate attribution to your colleagues who prepared the data. Also discuss your own data and explain why they are unsuitable.
5. **Success of Experiments**. Each experiment that results in data that can reasonably be evaluated (assays, plates, gels, etc.) will be graded for the level of "success". The instructors will use their discretion in selecting which experiments will be subject to this evaluation. Points will not be awarded to students who are absent from class for **any** reason.

Date	Day	Lecture or Lab	Topic	Reading	Assignments Due
Aug. 30	Wednesday	Lecture 1	Course Intro., Sterile technique, growth of bacteria	**Preface, Ch. 1-3**	
Aug. 31	Thur	No Class			
Sept. 4	Monday	**Labor Day Holiday**	**No Class**		
Sept. 5-7	Tue-Thur	Lab Period 1	Expts. 1A, 1B		
Sept. 11	Monday	Lecture 2	λ: lifecycle + use in cloning	**Chapter 4**	**Module: Expt. 2A, 2B**
Sept. 12-14	Tue-Thur	Lab Period 2	Expts. 2A, 2B		
Sept. 18	Monday	Lecture 3	Plasmids - DNA structure, properties of plasmids	**Chapter 5**	**Module: Expt. 3A/B, 3C**
Sept. 19-21	Tue-Thur	Lab Period 3	Expts. 3A, 3B, 3C, 3D		
Sept. 25	Monday	Lecture 4	Genes & proteins, transcription, translation	**Chapter 9**	**Module: Expt. 4B**
Sept. 26-28	Tue-Thur	Lab Period 4	Expts. 4A, 4B		**Notebooks: Labs 1 - 3C**
Oct. 2	Monday	Lecture 5	Recombinant DNA methods – steps in cloning, restriction, ligation	**Chapter 7**	**Module: Expt. 5A, 5B**
Oct. 3-5	Tue-Thur	Lab Period 5	Expts. 5A, 5B		
Oct. 9	Monday	Lecture 6	Gene expression – transcription factors, *lac* repressor, T7 promoter	**Chapter 5**	
Oct. 10-12	Tue-Thur	Lab Period 6	Expts. 6A, 6B		
Oct. 16	Monday	**1st Exam**	**Lectures 1-6, Labs 1-6**		
Oct. 17-19	Tue-Thur	Lab Period 7	Expts. 7A, 7B		**Notebooks: Labs 3D - 6A**
Oct. 23	Monday	Lecture 7	Protein expression & purification	**Chapter 6**	
Oct. 24-26	Tue-Thur	Lab Period 8	Expts. 8A, 8B		
Oct. 30	Monday	Lecture 8	Topoisomerases, helicases and supercoiling		
Oct. 31-Nov. 2	Tue-Thur	Lab Period 9	Expts. 9A, 9B		**Notebooks: Labs 6B - 8B;**
Nov. 6	Monday	Lecture 9	Polyacrylamide gel electrophoresis	**Chapter 6**	**Module: Expt. 10B**
Nov. 7-9	Tue-Thur	Lab Period 10	Expts. 10A, 10B	**Chapter 10**	
Nov. 13	Monday	Lecture 10	Preparation of Lab Report		**Module: Expt. 11B, 11C**
Nov. 14-16	Tue-Thur	Lab Period 11	Expt. 11A, 11B, 11C (11B done outside of lab)		**Notebooks: Labs 9A – 10B**
Nov. 20	Monday	Lecture 11	Antibodies and immunochemical analysis		
Nov. 22	**Wednesday**		**Lab Report Due by 12:00 noon (P2A-8B)**		**Place in wooden box – Room 113**
Nov. 21-23	Tue-Thur	**Thanksgiving Day Holiday**	**No Class**		
Nov. 27	Monday	Lecture 12	Bacteriophage M13 cloning and molecular biology	**Chapter 10**	
Nov. 28-30	Tue-Thur	Lab Period 12	Expt. 12		
Dec. 4	Monday	Lecture 13	Complimentarity test / Review session		**Module: Expt. 13**
Dec. 5-7	Tue-Thur	Lab Period 13	Expt. 13 - Lab Check-out		
Dec. 12	Tuesday	**2nd EXAM: 3:00 p.m. – 5:00 p.m.**	Notebooks due by 3:00 p.m.		**Notebooks: Labs 11 -13**

Sections taught by Dr. Montgomery
Sections taught by Dr. Martinez-Hackert
Sections taught by Dr. Jin