

## BIOCHEMISTRY 353

Spring 2004

MWF: 9:00- 9:50 a.m. - 112 Chemistry Annex  
Instructors: Dr. David J. Shapiro, Dr. Craig A. Mizzen

Date	Day	Topic	Lecturer
1/21	W	Introduction: Genes, genomes and the genetic code	D.S. 1
1/23	F	Recombinant DNA technology: Sequencing, mapping, cloning	D.S. 2
1/26	M	Recombinant DNA technology: Enzymes, PCR	D.S. 3
1/28	W	Characterizing gene expression: Microarrays, RT-PCR	D.S. 4
1/30	F	DNA replication and repair	D.S. 5
2/2	M	DNA replication and repair: prokaryotic transcription	D.S. 6
2/4	W	Prokaryotic transcription: DNA binding regulatory proteins	D.S. 7
2/6	F	Prokaryotic transcription: Regulatory proteins and attenuation	D.S. 8
2/9	M	Cell-free transcription: Overview of eukaryotic transcription	D.S. 9
2/11	W	Promoter elements and gene-specific transcription factors	D.S. 10
2/13	F	<b>Exam 1</b> , Covers 1/21-2/11	D.S. 11
2/16	M	DNA binding domains and nuclear hormone receptors	D.S. 12
2/18	W	Nuclear receptors , coactivators and corepressors	D.S. 13
2/20	F	Yeast 2 hybrid system, chromatin: General features,	D.S. 14
2/23	M	Chromatin IP assays, histone modification	D.S. 15
2/25	W	Modulation of chromatin structure in gene expression	D.S. 16

### The RNA World: Regulating Eukaryotic Transcription at the RNA Level

2/27	F	RNA processing, RNA enzymes	D.S. 17
3/1	M	RNA processing, evolving RNAs,	D.S. 18
3/3	W	Polyadenylation and mRNA capping, mRNA degradation	D.S. 19
3/5	F	mRNA degradation, RNA editing	D.S. 20
3/8	M	RNA interference, micro RNAs	D.S. 21
3/10	W	<b>Exam 2</b> , Covers 2/16-3/8	D.S. 22

3/12	F	Protein Synthesis I: Overview, tRNA structure and charging	C.M. 1
3/15	M	Protein Synthesis II: Ribosome structure, Initiation, Elongation	C.M. 2
3/17	W	Protein Synthesis III: Termination, Regulation, Wobble	C.M. 3
3/19	F	Protein Targeting I: Overview, protein secretion	C.M. 4
3/22	M	Protein Targeting II: membrane-associated proteins	C.M. 5
3/24	W	Protein Targeting III: organelles	C.M. 6
3/26	F	Protein Modification I: Overview, analytical methods	C.M. 7
3/29	M	Protein Modification II: glycosylation	C.M. 8
3/31	W	Protein Modification III: lipidation	C.M. 9
4/2	F	Protein Modification IV: proteolytic processing and turnover	C.M. 10
4/5	M	<b>Exam 3</b> Covers 3/12-4/2	C.M. 11
4/7	W	Signal Transduction I: Overview, protein interaction modules	C.M. 12
4/9	F	Signal Transduction II: G-protein coupled receptors	C.M. 13
4/12	M	Signal Transduction III: Tyr kinases	C.M. 14
4/14	W	Signal Transduction IV: Ser/Thr kinases, other signals	C.M. 15
4/16	F	Nuclear Signaling I: Overview, transcription factor regulation	C.M. 16
4/19	M	Nuclear Signaling II: histone modifying activities	C.M. 17
4/21	W	Nuclear Signaling III: chromatin remodeling activities	C.M. 18
4/23	F	Cell Cycle I: Overview, regulation	C.M. 19
4/26	M	Cell Cycle II: chromatin dynamics and assembly	C.M.20
4/28	W	Cell Cycle III: transformation, apoptosis	C.M.21
5/5	W		C,M.22
5/12	W	<b>Final Exam, , 8-11 a.m (date and time are tentative)</b>	

## COURSE ORGANIZATION

Class Handouts: Some handouts may be distributed in the lectures, with copies available from the Dept. of Biochemistry office in 419 RAL. Copies of class materials will be available at UpClose, 714 5. Sixth St., Champaign. The Department of Biochemistry is underwriting the bulk of the cost associated with the reproduction of the lectures and the lecturers do not profit from the sale of the notes. However, because of the high cost of printing and associated fees, the lecture notes will be sold at nominal cost to the student. Students are responsible for all material on the handouts and all material presented or assigned during lectures.

Text: Although no new textbook is required, Genes VIII by Lewin (Pearson, Prentice Hall, 2004) is very strongly recommended. Much of the material covered in the first half of the semester and a fair amount of material covered in the second half of the semester is treated in-depth in Genes VIII. Nelson and Cox will not be adequate for this material. Despite its title, Genes VIII covers a variety of subjects. Genes VIII should be available in the university bookstore. If Genes VIII is not available, Genes VII, would be helpful. There is some coverage of the material in standard Biochemistry textbooks. We will list chapters or pages of "relevant" reading in the following books..

Berg, J.M., Tymoczko, J.L. and Stryer, L. *Biochemistry* (5<sup>th</sup> Ed. 2002, Freeman)  
Lewin, B., *Genes VII* (2000), Oxford University Press  
Lewin, B., *Genes VIII* (2004) (Pearson Prentice Hall)  
Nelson, D.L., & Cox, M.M, *Lehninger Principles of Biochemistry*, (3rd ed. 2000), Worth

### Review articles:

Copies of relevant review articles will be listed on the lecture handouts. They can be accessed through the universities on-line e-journals.

### Office Hours:

Tutor to be named later

Dr. David J. Shapiro (413 RAL, TEL: 333-1780, E-mail: [djshapir@uiuc.edu](mailto:djshapir@uiuc.edu))

Office Hours: Mon, 10-11 a.m., Wed. 3-4 p.m., Thursday, noon-1 p.m.

Dr. Craig A. Mizzen (565 MH, TEL: 244-4896, E-mail: [cmizzen@uiuc.edu](mailto:cmizzen@uiuc.edu))

### Old Exams and Practice Problem Sets:

Previous and hourly exams and final exams with and without answers will be placed on the course web site. **URL to be announced.**

### Review Session:

The times and locations of review sessions will be announced in the lectures. Attendance at review sessions (usually held the Wednesday evening before a Friday exam) is optional; students may enter and leave as they wish. Because the size of the class does not permit significant discussion during lectures, these review sessions provide a good opportunity to ask questions in a less formal setting.

### Grading Procedures:

1. There are no pre-ordained quotas for the numbers of A, B and C grades in the course. Cutoffs for A's, B's, C's and D's will be set on the basis of gaps in the final distribution of scores. Because one of the hour exam grades is dropped, assigning grades for individual exams is not useful. However, based on past experience, if your score falls at or near the class average for a given examination, your grade is likely to be a low B. **Graduate students and undergraduate students will be graded on separate curves.**
2. There will be **3** one-hour exams to be administered during the lecture periods. The results of the separate exams will be normalized to compensate for variations in class averages on the

different exams. This does not change the relative standing of any of the students in the class. The lowest of the normalized grades will then be dropped. Each of the remaining grades will constitute 25% of the student's final grade. The normalization will be done as follows:

a. Assume you received the following scores on the hour exam:

Hour Exam	Score	Class Average
1	65	75
2	82	65
3	75	60

b. Normalized grade = your grade x normalization factor.

c. Normalization factor (normalize all exams to hourly exam with highest class average.

1st hour exam: factor =  $75/75 = 1.00$

2ndhourexam: factor =  $75/65 = 1.15$

3rd hour exam: factor =  $75/60 = 1.25$

d. Normalized grades are:

1st hour exam: factor = 65 x	1.00	= 65 (drop)
2ndhourexam: factor = 82 x	1.15	= 94
3rd hour exam: factor = 75 x	1.25	= 93

- No make-up hourly exams will be given. We will not excuse absences from any of the hourly exams. Obligations such as job interviews and planned trips do not excuse absences from exams. If a student misses an hourly exam, the normalized grades on the other two exams will automatically be used in computing the final grade in the course. If you skip the first or second hourly exam and are unable to take the third, you are in trouble. It is recommended that all students take all of the hourly exams.
- All students must take a final exam that will constitute 50% of the course grade. This exam will comprehensively cover the entire course with an approximate point distribution of 1/3 from the last 10 lectures and 2/3 from the entire course (1/3 from first 20 lectures, 1/3 from last 20 lectures, 1/3 from last 10 lectures). To be excused from the scheduled final exam, a student must receive approval from a college dean.
- All examination papers (including the final) will be returned as soon as possible after the day of the exam. Because of the size of the class, it may take as long as one week to grade the exams and record the grades. A key for each exam will be posted on the bulletin board near 407 RAL.
- Students who have compared their answers with the posted key and who then believe that their papers have been incorrectly graded may return their exam to the tutor with a note which describes in detail the grading error. Exams which are submitted for regrade may be subjected to regrade of ALL ANSWERS. Regraded papers may be picked up in 419 RAL. Grade corrections will be made only during the two weeks immediately following the date when the exams are returned (or, for the third exam, prior to the last regularly scheduled lecture).
- Students who give or receive aid on exams will receive an E in the course and may be dismissed from the University.