

Spring 2009: Advanced Cell Biology (BIO8033)

Instructor: Donna M. Gordon, Ph.D.

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Classroom Material:

Molecular Biology of the Cell, 5th Edition published by Garland Science and authored by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter is the text for the course. Be sure to purchase the textbook version that comes with a Media DVD-ROM as the video files and chapters 21-25 of the text are only found here. You will be required to read the chapters indicated for each weekly lecture as a supplement to the recorded video lectures.

This is a distance learning course and requires that each enrolled student have reliable access to a computer that connects to the internet. All course materials can be accessed through MyCourses (<http://myCourses.msstate.edu>) using your MSU NetID and password. Each topic covered in this course will have lecture material to view online, required readings associated with each topic, and a quiz to test your comprehension of the covered material. You will also be required to check your email on a regular basis, as this is the official means of communication for this course.

Contact Information:

You may contact the instructor using the email address provided on the MyCourse website. If you need additional assistance, or are not satisfied with the responses provided by email, you are encouraged to contact me at my office during normal business hours (9am - 5pm CST) at 662-325-9337. For all technical questions or problems, please contact Tracy Craven, the Instructional Technology Coordinator at the Division of Academic Outreach and Continuing Education by phone (662-325-8374) or email (TCraven@aoce.msstate.edu).

MSU Honor Code and Academic Misconduct:

You will be asked to acknowledge the University's policy on academic misconduct for all quizzes and exams. This will be in the form of a True/False question that will read as follows: "On my honor, as a Mississippi State Student, I have neither given nor received unauthorized assistance on this academic work." This statement will stand in for the official MSU Honor Code statement and your response to this question will be taken as your signature. Failure to acknowledge the Honor Code can result in a zero grade for the assignment.

Even though this is a distance learning course, you will be required to abide by all MSU policies with regard to academic conduct. Please view the following site outlining the Universities policies on misconduct for more information: <http://www.msstate.edu/dept/audit/1207A.html>. A link to the MSU honor code is also posted on the myCourses homepage.

You will be required to complete all assignments, quizzes, and exams without outside assistance. Faculty members and students are responsible for reporting cases of misconduct. Penalties for cheating may include receiving an "F" for this course, suspension, and/or expulsion from the University. Students have the right to appeal decisions made by the committee.

Quizzes:

All quizzes will be closed book. No lecture material or notes may be used to complete a quiz and you may not receive assistance from other individuals while taking a quiz. All quizzes must be completed within a restricted timeframe. Each quiz will be available online by **8am Friday** and must be completed by **10pm on Sunday**. All times are given in CST. We will cover material in 14 chapters during the semester at an average pace of 1 chapter per week. You will be required to take 12 quizzes throughout the semester. Only the scores from 10 quizzes will be used when determining

your final grade; your two lowest scores will be dropped. Each quiz will be worth 25 points with questions presented as True/False, Multiple Choice, Matching, Fill in the Blank, and/or Short Answer. You are encouraged to take the quizzes seriously as your top 10 quiz scores will make up ~33% of your final grade (see Course Grading, below). Since two scores will be dropped, there will be absolutely **NO** changes to either the time or days available to take the quiz. If you miss a quiz, you will receive a score of "0". No excuses will be considered, and no exceptions will be made.

Exams:

There will be two exams for this course: one midterm and one final. Exams will consist of True/False, Multiple Choice, Matching, Fill in the Blank, Short Answer, and Essay type questions. Similar to quizzes, all exams must be completed within a restricted timeframe and are closed book. No lecture material or notes may be used during the exam. You may not receive assistance from other individuals during an exam or from fellow students who may have already completed the exam.

Discussion Boards:

Discussion boards will be initiated by the instructor for selected topics. Students are encouraged to regularly participate in these discussion board sessions. Students will be able to read other's comments and post their own remarks, comments and/or questions that may be beneficial or of interest to the entire class. Effective use of the discussion board will include clarification of content and sharing of additional helpful information. This is a voluntary exercise and no grades will be given for your participation.

Content Summaries:

Written summaries meant to synthesize material covered within two of the topic areas will be required. These summaries must be submitted as a PDF or Word (.doc) file by the indicated deadlines. Each summary is worth 50 points for 100 points total (~13% of your final grade). When writing your summaries please be sure to follow these formatting guidelines: Arial or Helvetica font; 1 inch margins; single spaced; and 5 page maximum length. Proofread prior to submission; you will lose points for spelling errors and for not following the requested format. Summaries submitted after the posted deadline will incur a 2-point (4%) penalty per day that they are late.

Attendance Policy:

Although this is an online course, it is not a self-paced. Reasonable deadlines have been posted for the completion of all course work. All attempts must be made by the student to complete the assignments by their due dates. You must notify the instructor, within a reasonable timeframe, if a situation arises that will prevent you from completing the assignment in a timely fashion. The instructor will evaluate each incident on a case-by-case basis, with no guarantee that additional time will be provided. As noted above, a request for the extension of quiz deadlines will not be granted.

Course Grading:

Quizzes (10 quiz scores, 25pts each)	250 points total	(~33%)
Content summaries (2 summaries, 50pts each)	100 points total	(~13%)
Mid term exam	200 points	(~27%)
Final exam	200 points	(~27%)
Total	750 points	(100%)

Grading Scale:

A	675 – 750 points
B	600 – 674 points
C	525 – 599 points
D	450 – 524 points
F	Below 449 points

Course Outline:

Topic: Basic genetic mechanisms

Chapter 6: How cells read the genome: from DNA to protein (pgs 329-361, 366-388)

Associated media files: 6.1 RNA Structure (molecular model)
6.2 Transcription (animation)
7.4 TATA-Binding Protein (molecular model)
6.5 tRNA (molecular model)
6.4 RNA splicing (see folder on home page)
6.6 Translation I (animation)
6.7 Translation II (animation)

Chapter 7: Control of gene expression (pgs 411-426, 432-453, 467-497)

Associated media files: 7.1 Homeodomain (molecular model)
7.2 Zinc finger domain (molecular model)
7.3 Leucine zipper (molecular model)

Topic: Internal organization of the cell

Chapter 10: Membrane structure (pgs 617-648)

Associated media files: 10.1 Fluidity of the Lipid Bilayer (video)
10.2 Lipids and Lipid Bilayer (molecular model)
10.6 FRAP (videos)

Chapter 11: Membrane Transport (pgs 651-667)

Associated media files: 11.1 Na⁺ K⁺ pump (see folder on home page)
11.2 Transport by carrier proteins (folder on home page)

Chapter 12: Intracellular compartments and protein sorting (pgs 695-745)

Associated media files: 12.2 Nuclear Import (video)
12.3 Mitochondrial protein import (see folder on home page)
12.4 ER Tubules (video)
12.6 Protein translocation (see folder on home page)

Web links: Vesicular trafficking
Intracellular trafficking
Golgi apparatus animation

Chapter 13: Intracellular vesicular traffic (pgs 749-809)

Associated media files: 13.1 Clathrin (animations)
13.2 Biosynthetic Secretory Pathway (video)
13.5 Phagocytosis (video)
13.9 Synaptic Vesicle (animations)

Web links: Clathrin mediated endocytosis

Chapter 16: The cytoskeleton (pgs 965-1050)

Associated media files: 16.1 Dynamic Instability of Microtubules (video)
16.4 Intermediate filaments (see folder on home page)
16.6 Organelle Movement on Microtubules (video)
16.7 Kinesin (video)
16.8 Myosin (video)

Chapter 17: The cell cycle (pgs 1053-1112)

Associated media files: 17.1 Cdk2 (molecular models)
17.2 p53-DNA Complex (molecular models)
17.3 Plant Cell Division (video)
17.4 Animal Cell Division (video)
17.7 Mitotic Spindle (video)

Web links: Mitosis versus meiosis

Chapter 18: Apoptosis (pgs 1115-1129)

Associated media files: 18.1 Apoptosis (video)

Topic: Cells in their social context

Chapter 19: Cell junctions, cell adhesion, extracellular matrix (pgs 1131-1202)

Associated media files: 19.1 Adhesion Junctions Between Cells (video)

Chapter 20: Cancer (pgs 1205-1265)

Associated media files: 20.1 Breast Cancer (video)
20.2 Contact Inhibition (animation)

Web links: Cancer

Chapter 22: Development of multicellular organisms (pgs 1305-1341, 1398-1415)

Associated media files: None

Topic: Methods

Chapter 8: Manipulating proteins, DNA and RNA (pgs 427-432, 501-552, 571-576)

Associated media files: None

Web links: Electrophoresis method
Staining proteins in gels
Western blotting
Plasmid DNA prep
E. coli transformation

Chapter 9: Visualizing cells (pgs 579-613)

Associated media files: None

Web links: Phase contrast and DIC
Immunohistochemistry

Notes:

The majority of the associated media files referenced in the above Course Outline are available on the DVD provided with your textbook. Only the files that I had difficulty viewing have been posted online ("Course Content" and "Learning Modules" sections of the course). I have also provided links to several websites ("Course Content" and "Learning Modules" sections of the course) meant to supplement several lectures that I am requesting you view for additional helpful information.

List of web site addresses:

Vesicular trafficking

http://cellimages.ascb.org/cdm4/item_viewer.php?CISOROOT=/p4041coll12&CISOPTR=251&CISOBX=1&REC=8 (2:55 minutes)

Intracellular trafficking (Excellent animation)

<http://www.studiodaily.com/main/technique/tprojects/6850.html> (3:08 minutes)

To see this animation with a description of the events (voice over) see the "Inner Life" at <http://multimedia.mcb.harvard.edu/media.html>

Golgi apparatus animation

http://cellimages.ascb.org/cdm4/item_viewer.php?CISOROOT=/p4041coll12&CISOPTR=549&CISOBX=1&REC=3 (2:17 minutes)

Clathrin mediated endocytosis

http://cellimages.ascb.org/cdm4/item_viewer.php?CISOROOT=/p4041coll12&CISOPTR=545&CISOBX=1&REC=4 (2:26 minutes)

Mitosis versus meiosis

http://www.pbs.org/wgbh/nova/baby/divi_flash.html (self-paced)

Cancer

<http://outreach.mcb.harvard.edu/materials.htm> (self-paced)

Electrophoresis method

<http://www.jove.com/index/details.stp?ID=758> (8:17 minutes)

Staining proteins in gels

<http://www.jove.com/index/details.stp?ID=760> (10:55 minutes)

Western blotting

<http://www.jove.com/index/details.stp?ID=264> (22:45 minutes)

Plasmid DNA procedure

<http://www.jove.com/index/details.stp?ID=247> (9:24 minutes)

E. coli transformation

<http://www.jove.com/index/details.stp?ID=253> (7:46 minutes)

Phase contrast microscopy

<http://www.jove.com/index/details.stp?ID=844> (6:49 minutes)

Immunohistochemistry

<http://www.jove.com/index/details.stp?ID=552> (11:27 minutes)

BIO8033 Course Deadlines:

Assignment	Chapter to be covered	Chapter material release date	Dates available for chapter quiz
Quiz 1	Chapter 6	January 7, 2009	January 16-18, 2009
Quiz 2	Chapter 7	January 14, 2009	January 23-25, 2009
Quiz 3	Chapters 10 and 11	January 21, 2009	January 30 - February 1, 2009
Quiz 4	Chapter 12	January 28, 2009	February 6-8, 2009
Quiz 5	Chapter 13	February 2, 2009	February 13-15, 2009
Content Summary	Chapters 12 and 13	N/A	February 20-22, 2009
Quiz 6	Chapter 16	February 18, 2009	February 27 - March 1, 2009
Midterm	Chapters 6, 7, 10, 11, 12, 13, and 16	N/A	March 6-8, 2009
Quiz 7	Chapter 17	March 4, 2009	March 13-15, 2009
Quiz 8	Chapters 18 and 19	March 11, 2009	March 20-22, 2009
Content Summary	Chapters 17 and 18	N/A	March 27-29, 2009
Quiz 9	Chapter 20	March 25, 2009	April 3-5, 2009
Quiz 10	Chapter 22	April 1, 2009	April 10-12, 2009
Quiz 11	Chapter 8	April 8, 2009	April 17-19, 2009
Quiz 12	Chapter 9	April 15, 2009	April 24-26, 2009
Final*	Chapters 8, 9, 17-20, and 22	N/A	May 1-3, 2009

* Final grades are due to the registrar by May 5, 2009 at noon. Therefore an extension for completing the final exam will be permitted.

Understanding the above time table:

Quiz 1:
Please read the pages listed on the syllabus for Chapter 6. You can view the recorded lecture material for this chapter beginning on January 7th. At this time, all other material for this chapter will also be made available to you (PDF and MP3 files of lectures, discussion question(s), relevant website addresses, etc). The quiz that will test your knowledge of this material can be accessed beginning 2pm on January 16th and must be completed before 10am on January 18th. The quiz will be timed and can only be taken once.