



*\*BISC372 Introduction to Cell Biology Syllabus*

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## **COURSE OVERVIEW**

BISC372 is a remote online course designed to provide each student with a broad introduction into the structure and function of mammalian eukaryotic cells. The course begins by learning about the molecules and macromolecules that give rise to the structural elements and organelles in all eukaryotic cells and ends discovering how multicellular organs coordinate their efforts to perform useful work for the greater organism.

**Prerequisites:** Passed the BISC160/162 and BISC161/163 series with a **C** or higher.

**Department policy for majors:** This is a **3 credit** course that counts towards a **Biology** major as a 300 or above elective. A **C** or higher grade is required for it to count toward a **Biology** major.

### ***Instructor***

**R. Brian Doctor, Ph.D.**

Instructional Professor

Email: [rbdoctor@olemiss.edu](mailto:rbdoctor@olemiss.edu)

Biology Department

Phone: (662) 915-1390

Office: 414 Shoemaker Hall

ZOOM Office Hours: TUES 3:00 to 4:00

WED 2:00 to 3:00

## **COURSE DESCRIPTION**

The discipline of cell biology occupies a pivotal position in the biologic sciences. Cell biology bridges the basic sciences such as chemistry, biochemistry and molecular biology with the more integrative sciences such as physiology and medicine. This course provides students with a broad exposure to the fundamental principles, structures and functions of cells. Cells are the fundamental unit of life and are, therefore, essential entities in all taxonomic domains. While prokaryotic cells (i.e. anucleated cells; e.g. bacteria, archaea) will be touched on, the emphasis of the course will be placed on the eukaryotic (i.e. nucleated cells with distinct organelles; e.g. protozoa, plants, animals). Further, amongst the variety of eukaryotic cells, the primary emphasis will be on the structures and functions of mammalian cells.

## **METHODS of INSTRUCTION**

As a remote-online course, a significant level of the responsibility for learning the material will be placed on the student.

- In general, the course will include mandatory reading assignments and viewing of powerpoint slides &/or videos to be completed PRIOR to the related ZOOM Question & Answer period.
- The ZOOM Q&A periods will be held on ZOOM on the days and times that were originally designated to the face-to-face class (MWF; 9:00 to 9:50).
- Some of the prepared questions will be addressed to the whole class but most will be directed to specific individual students that are selected at random. Answers will be subjectively scored on participation, enthusiasm, logic and correctness.
- Following the ZOOM Q&A periods on Fridays, a handout with questions, problem sets or assignments in a variety of formats on the topics covered that week will be posted on Blackboard. These will need to be (1) converted to **pdf.**, SAVED with the title formatted as shown below and 'dropped' in the Instructors **BOX account.**
- Prior to dropping of the completed handouts, **ENTITLE THE FILE**
  - **COURSE NUMBER: 372**
  - **DATE (YR-YR-MO-MO-DY-DY) 200824**
  - **INITIALS (FIRST TWO of LAST name-first initial-second initial**

Ex, Darius Jermaine Amos sends me his handout on Christmas Eve; the file would be titled **372 201224 AmDJ**

- ZOOM Office Hours will be on **TUESDAYS from 3:00 to 4:00**  
**WEDNESDAYs from 2:00 to 3:00.**
- Three multiple choice exams (50 questions; 50 min) will be taken across the semester (Sept 16<sup>th</sup> , Oct 9<sup>th</sup> , Nov 17<sup>th</sup> ). There will NOT be an additional cumulative Final exam.

## **COURSE EXPECTATIONS**

### **PRIOR to ZOOM Q&A**

- **READ the assigned Textbook material**
- **READ any additional assigned texts/reviews**
- **VIEW the posted PPT File for the Zoom meeting**
- **VIEW any assigned Videos (URLs will be provided)**

## **DURUNG ZOOM Q&A**

***Be ENGAGED and PARTICIPATE!!!***

- **ASK ANY QUESTIONS you have**
- **ANSWER QUESTIONS asked of you**
- **ANSWER QUESTIONS asked openly to the class**

The sequence of the modules that make up the course is deliberate so that concepts and content you will need to understand your current module will have been included in previous modules. Thus, if you have the inclination to read ahead that is great. Working ahead on other parts of other modules, however, may be counterproductive. The time would likely be better spent building the depth of understanding of the current modules. Please contact your instructor for guidance in directions to take your independent exploration.

## **TIME MANAGEMENT**

As a full-time student, 15 credit hours correlates roughly with a 45 hour work week. In a 3 credit hour class, students should anticipate investing a minimum of 9 hours each week to complete the reading, view the attached powerpoints, watch the pasted videos, attend the Zoom Q&A sessions, drop in during Office Hours, contemplate Cell Biology alone and discuss Cell Biology with classmates. That is a lot to get into 9 short hours each week. To do so will require students to be efficient and focused. Further, students should make every effort to keep up with the material throughout the course and avoid putting off studying until two days leading into the exam.

## **ASSIGNMENT SUBMISSION**

Handout Assignments: Each Friday a Handout Assignment will be posted on Blackboard and will be due on the following Monday. When completed,

- SAVE the file as instructed above (recall the course number, Christmas Eve assignment from Darius Jermaine Amos was saved as ( 372 201224 AmDJ )
- DROP in the appropriate folder in the instructor's BOX account (<https://olemiss.app.box.com/f/c888d92bd3fd46699740a0309cbf086f>).
- Please bookmark this site address to facilitate your submissions.
  - Formats will be varied
  - Discussion between classmates about the concepts and ideas about the topics being covered is strongly encouraged
  - the Answers to the Assignment questions, however, are expected to be the product from each individual student
  - Assignments are due on the following Monday by 5:00 p.m.
  - The Top 10 assignment scores will be used to determine the final Handout grade.

## EXAMS

Three exams will be given

NO Cumulative Final exam

Exams will be viewed and answered on Blackboard (<https://blackboard.olemiss.edu/>)

Date/Time	Sept 16 <sup>th</sup>	9:00 to 10:00 a.m.
	Oct 7 <sup>th</sup>	9:00 to 10:00 a.m.
	Nov 20 <sup>th</sup>	<b>TBD</b>

## REQUIRED COURSE ASSETS

### **TEXTBOOK**

#### **Karp's Cell and Molecular Biology, 8<sup>th</sup> Edition**

Janet Iwasa and Wallace Marshall; Wiley Press

ISBN: 978-1-118-88614-4

### **TECHNOLOGY**

#### *INTERNET ACCESS*

You must have access to high speed Internet throughout the semester.

#### *SOFTWARE*

You must have access to a computer with software capable of generating, storing and transferring documents in Word (.docx) and PDF (.pdf). Microsoft Office has these capabilities.

#### *BROWSERS, PLUG-INS, PLAYERS AND VIEWERS*

These includes:

- [Blackboard-supported browser](#) – **Firefox** is preferred on all computers
- [Acrobat Reader](#)
- Run [Blackboard Browser Checker](#) to verify browser and technologies on your computer.

#### *HARDWARE*

Computer Speakers or headsets

### **TECH SUPPORT**

The [IT Helpdesk](#), centrally located in Weir Hall, is open Monday through Friday, 8 a.m. to 5 p.m.

The helpdesk offers assistance to Ole Miss students and employees with technology-related issues involving software, hardware and networking. It provides support for email, Wi-Fi,

Microsoft Office and other campus-wide applications. Come by Weir Hall or call us at 662-915-5222. Email [helpdesk@olemiss.edu](mailto:helpdesk@olemiss.edu) or visit their website for more information.

## COURSE POLICIES

### COMMUNICATION

Instructor communication to the class: announcements will be posted on Blackboard  
Instructor communication to individual students: e-mail will be used to initiate contact;  
Zoom meeting with individuals will be used if it facilitates communication

Students to the Instructor: e-mail is the most reliable means of getting a message across; efforts are made to answer e-mails received before 5:00 p.m. on the same day  
address: [rbdoctor@olemiss.edu](mailto:rbdoctor@olemiss.edu)

ZOOM Office hours (TUES 3:00 to 4:00; WED 2:00 to 3:00) are also an excellent time to converse with the instructor.

Individual ZOOM meetings with the instructor can also be set up by the student by sending an e-mail; please include a few preferred times

calling the office phone (662-915-1390) is an option, however: time spent in the office will likely be limited this semester  
messages are not monitored or played back

### GRADING

Grades will be calculated from elements in four different categories.

1. There will be three exams. Each will be worth 50 points.
2. There will also be about a dozen handouts that are scored from 0 to 10 points. These scores will be normalized to make Handouts worth 150 points total.
3. There will also be around three dozen Zoom Question and Answer meetings. Attendance will be kept for the Zoom Q&A meetings; the percentage of meetings a student attends divided by two will serve as their attendance score.
4. For many of the Questions, specific students will be asked for answers with the quality, logic and correctness going into scoring each answer between 0 and 10. At the end of the semester, the student's average score will be normalized to 50 and entered.

CATEGORY	POINTS	% of TOTAL	
<i>Exam 01</i>	50	12.5	

<i>Exam 02</i>	50	12.5	
<i>Exam 03</i>	50	12.5	
<i>Handouts</i>	150	37.5	
<i>Zoom Attendance</i>	50	12.5	
<i>Zoom Q&amp;A</i>	50	12.5	
<b>TOTAL</b>	<b>400</b>	<b>100</b>	

### **GRADING SCALE**

A = 90 – 100%

B = 80 – 89%

C = 70 – 79%

D = 60 – 69%

F = Below 59%

**\*\*NOTE:** The instructor reserves the latitude to curve the Grade Scale. In practice over the last six semesters there has been very little curve applied at the A and B level. The C level, however, tends to have a notable curve.

### **ATTENDANCE POLICY**

Attendance to the Zoom Question & Answer sessions is considered a pivotal element of the course. Consequently, attendance will be recorded at the Zoom sessions. Unexcused absences will result in a loss of points. The attendance points will be set to the percentage of classes attended.

Excused absences include illness (with a doctor's note), graduate/professional school interviews and post-graduation job fairs/visits.

### **LATE WORK POLICY**

For the Handout Assignments, up to 5% per day may be deducted from the graded score for that assignment.

### **ZOOM Q&A POLICIES**

- Meetings are to start at 9:00 a.m. sharp. Students should log into the meeting PRIOR to 9:00
- Students should MUTE their station until they want to speak
- Students MUST activate their VIDEO in order to be credited with attendance
- Students should have scratch paper/ legal pad with bold pens handy
- Students should have their textbooks handy

## UNIVERSITY of MISSISSIPPI POLICIES

### ***Testing Policy***

If you will be using the proctored testing service offered by the Distance Education Testing Lab, include the University of Mississippi's [Proctored Assessments in Online Education](#)

### ***Disability Access and Inclusion***

The University of Mississippi is committed to the creation of inclusive learning environments for all students. If there are aspects of the instruction or design of this course that result in barriers to your full inclusion and participation or to accurate assessment of your achievement, please contact the course instructor as soon as possible. Barriers may include, but are not necessarily limited to, time limits, difficulty with the acquisition of lecture content, inaccessible web content or the use of non-captioned or non-transcribed video and audio files. Students must also contact Student Disability Services at 662-915-7128 or [sds.olemiss.edu](mailto:sds.olemiss.edu) so that office can 1) explore if barrier removal is necessary; 2) provide you, if approved, with Instructor Notification forms; 3) facilitate the removal of curricular barriers; and 4) ensure you have equal access to the same opportunities for success that are available to all students.

### ***Copyright Notice***

Materials used in connection with this course may be subject to copyright protection under Title 17 of the United States Code. Under certain Fair Use circumstances specified by law, copies may be made for private study, scholarship, or research. Electronic copies should not be shared with unauthorized users. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability as well as disciplinary action under University policies.

### ***IT Appropriate Use Policy***

This policy sets forth the privileges of and restrictions on students, faculty, staff, and other users with respect to the computing and telecommunications systems offered by the University of Mississippi (UM). This policy is designed to protect the University community from illegal or damaging actions by individuals, either knowingly or unknowingly. Inappropriate use exposes the University to risks, including virus attacks, compromise of network systems and services, and legal issues. This policy directly addresses copyright issues related to illegal downloads and peer-to-peer file sharing. For Appropriate Use Policy questions, send an email to [aup@olemiss.edu](mailto:aup@olemiss.edu).

### ***Academic integrity***

The University of Mississippi is dedicated to supporting and sustaining a safe and scholarly community of learning dedicated to nurturing excellence inside and outside of the classroom. Each student has a duty to become familiar with University values and standards reflected in University policies, and each student has a duty to honor University values and standards reflected in University policies. These policies are outlined in the [M Book](#). For a complete listing of policies, please visit the University Policy Directory.

### ***Verification of Student Attendance Policy***

The University must abide by federal guidelines to verify the participation of online students. For all course types, including thesis, internships, labs, online courses, etc., the instructor must verify your participation based on some type of participation. This may include submission of an online assignment or other course related contact with the instructor. (However, simply logging into Blackboard will not count as an academically related activity.)

### ***Student Identity Policy***

Federal regulations, our accrediting agency (SACS) and university policies require that safeguards are used to ensure that the student who receives the academic course credit is actually the person doing the work. You will need to present your student ID before taking proctored exams and your instructor may verify your identity through live or virtual meetings, or by using an identity verification program.

### ***Student Privacy Policy***

The University of Mississippi protects the privacy of all students, including online and distance learning students, through adherence to the Family Educational Rights and Privacy Act of 1974 (FERPA) through compliance with other institutional policies and procedures governing the management and security of protected information of faculty, staff, and students, and by outlining the expectations of privacy for the university community as REGARDS to electronic information. [Student Privacy Policy](#)









## **BISC372 Cell Biology LEARNING OBJECTIVES**

**By the end of the course, students will be able to:**

### **Cell Theory and the First Cell**

1. Cite the two main tenets and the primary corollary of the *Cell Theory*
2. Expound on the role that *microscopy* played in developing the *Cell Theory*
3. Explain the logic that concludes that life began from a single cell
4. Form a logical hypothesis regarding the origin of the FIRST cell

### **Cellular Chemistry**

5. identify the four elements that comprise 99% of the elements in a cell
6. list four forms of bonding between elements and molecules
7. explain the logic for *covalent bonds* forming *intramacromolecular bonds*
8. explain the logic for *non-covalent bonds* forming *intermacromolecular bonds*

### **Cell Taxonomy**

9. Compare the common features in cells from the three taxonomy domains
10. Contrast the disparate features in cells from the three taxonomy domains

### **Eukaryotic Organelles**

11. list and describe the organization and function of key eukaryotic cells

### **Mitochondria & Energy**

12. recite the 1<sup>st</sup> and 2<sup>nd</sup> Laws of Thermodynamics
13. explain the consequences of the 1<sup>st</sup> and 2<sup>nd</sup> Laws of Thermodynamics
14. show the increased efficiency of aerobic vs anaerobic glycolysis
15. identify the transformations of energy that occur during aerobic glycolysis

### **Central Dogma of Molecular Biology**

16. tattoo on your arm: DNA is transcribed into RNA, RNA is translated into protein

### **DNA Packing**

17. list five different levels of eukaryotic DNA packing
18. describe the functional impact of being packed at different levels

### **RNA Functions**

19. match the form of RNA with its role in protein synthesis and homeostasis

### **Proteins**

20. describe the four levels of protein structure
21. discern how proteins are targeted to the cytoplasm, nucleus, ER or endomembrane system
22. explain the concept of conformational change impacting protein activity
23. state four primary mechanisms that regulate protein activities

### **Membranes**

24. elucidate the general features of cell membranes
25. define 'amphipathic' and how that contributes to membrane structure
26. List the three types of lipids within eukaryotic cells
27. describe the relative distribution of specific lipids in the membrane leaflets

### **Membrane Vesicles**

28. list the three disparate forms of coat proteins
29. draw out the general steps in membrane vesicle formation and detachment
30. discriminate the specific roles of *adaptor proteins, clathrin & dynamin*
31. state the role of *arf small GTPases* in membrane vesicle formation
32. state the role of *rab small GTPases* in membrane vesicle targeting

### **Membrane proteins**

33. list the three disparate forms of membrane proteins
34. describe the 1o and 2o protein structures in the transmembrane domain
35. generate and read *hydropathy plots* for integral membrane proteins

### **Transmembrane Transport**

36. discriminate the driving forces for *pumps, passive transporters, secondarily active transporters & ion channels*
36. map out the molecular sequence of Na,K ATPase pumping
37. explain the 'secondarily active' concept and how organisms use them
38. Recognize that transporters require ligand binding and conformational changes
39. Recognize that Ion channels do NOT bind ligands
40. Recognize that transporters transfer  $\sim 10^3$  ligands/hour
41. Recognize that channels move  $> 10^6$  ions/sec; transporters  $\sim 10^3$  ligands
42. explain the *electrochemical gradient* and how it drives ion fluxes
43. apply the Nernst Equation to calculate the Nernst potential
44. apply the Goldman-Hodgkin-Katz Equation to get the membrane potential

### **Cytoskeleton-Microtubules**

45. explain how tubulin dimers polymerize into protofilaments
46. explain how 13 protofilaments align to form microtubules
47. describe the polarity of MTs
48. compare & contrast four different *microtubule organizing centers*
49. compare & contrast MT Motor proteins (kinesins & dyneins)
50. describe the how MTs move and position vesicles and organelles

## **Cytoskeleton-Intermediate Filaments**

51. List the FIVE intermediate filament families
52. List the sites or cell types that specifically express *intermediate filaments*

## **Cytoskeleton-Actin**

53. draw the innate actin polymerization kinetics graph
54. label and explain the graph's *nucleation* phase
55. label and explain the graph's *elongation* phase
56. label and explain the graph's *equilibrium* phase
57. explain the relation between *critical concentration & polymerization*
58. explain what is happening and why during *actin treadmilling*
59. compare & contrast *Arp2/3* & *formin* nucleating proteins
60. recognize the functional significance of *actin associated proteins*

## **Cell Motility**

61. explain the five steps underlying *cell migration*
62. appreciate the importance of *Arp2/3 actin nucleation*
63. draw the *actin* organization of *lamellapodia*
64. draw the *actin* organization of *filopodia*
65. defend *actin polymerization* as the primary driving force for cell migration
66. describe the effect of activating Rho family members (rho, rac, cdc42)
67. define *spatiotemporal regulation*

## **Cell Cycle**

68. describe the significance of activating *cyclin dependent kinases*
69. describe the role of distinct *cyclins*
70. describe the roles of CDK phosphorylation

71. draw the concentration and activity of a CDK and its cyclin
72. describe the role of *CDTK Inhibitors* in cell protection
73. describe how *p53* is regulated and activated
74. outline three pathways that are initiated by *p53*
75. define *mitosis*
76. list the five phases of *mitosis*
77. describe the key event(s) in each phase
78. name and draw the three populations of *microtubules* involved in *mitosis*
79. answer for each *MT population* if they engage in *chromosome segregation*
80. answer for each *MT population* if they engage in *spindle pole migration*
81. define *cytokinesis*
82. describe the contribution *actin* plays in *cytokinesis*

### **Stem Cells**

83. provide three characteristics of a 'classic' *stem cell*
84. distinguish between *omnipotent, pluripotent & multipotent*
85. compare and contrast *intestinal stem cells vs 'classic' stem cells*
86. compare and contrast muscle *satellite cells vs 'clasic' stem cells*
87. describe an *induced pluripotent stem cell*
86. define *Yamanaka factors*
89. describe the benefit of using *iPS cells* in tissue transplant studies

### **Apoptosis: programmed cell death**

90. list the hallmark features of *apoptosis*
91. describe three physiologic conditions where *apoptosis* plays a central role

### **Cell-Cell Communications**

92. list a distinguishing feature between *endocrine vs paracrine vs autocrine vs contact dependent vs steroid hormone vs nitric oxide* signaling
93. diagram an example for each of the above forms of *cell signaling*
94. list three main groups of *signal receptors*
95. provide key features for each of the receptor groups
96. provide a physiologic example of each of the three receptor groups

### **Tissue Types**

97. list the four basic tissue types found in animals
98. list the key feature(s) found in each of the four tissue types
99. list a cell type that does NOT fit completely into one tissue type category
100. defend the conclusion that the cell type listed in #99 belongs in >1 group

### **Epithelial Tissues**

101. describe the anatomical positioning of epithelial cells
102. describe the physiologic function of epithelial cells
103. describe the adjacent surface to *apical, basal & lateral membranes*
104. list the four cell-cell junction structures on the lateral membranes
105. list the primary function(s) of each junctional complex
106. define *homotypic binding* and the relevance in epithelial cells

**\*\*for *glomerular podocytes, proximal tubule cells, medullary thick ascending limb cells and principal cells of the collecting duct*, four different epithelial cell types along the length of the nephrons within kidneys that work together to coordinate and balance water retention vs excretion:**

107. compare and contrast the *transepithelial resistance* across each segment
108. compare and contrast the *tight junctional complexes* across each segment
109. compare and contrast the *water flux rates* moving across each segment
110. compare and contrast the *water flux routes* across each segment

## COURSE OUTLINE

(\*NOTE: LO = Learning Objective; correlates with the Objectives listed above)

Module	LO	Topics/Materials	Activities & Assignments	Date Due
		<b>WEEK 1</b>		
		INTRODUCTION	ZOOM mtg-01	Aug 24th
<b>1</b>	<b>1-4</b>	ORIGIN OF LIFE		Aug 26 <sup>th</sup>
		Spontaneous Generation	View PPT-01	
		Contribution by Microscopy	READ CMB 1.1 View PPT-01	
		Cell Theory	READ CMB-1.1-1.2 View PPT-01 View VIDEO-01 ZOOM Q&A-01A	
		The First Cell	READ posted pdf View PPT-01 ZOOM Q&A-01B	Aug 28 <sup>th</sup>
			<b>HANDOUT A</b>	<b>Due Aug 31<sup>st</sup></b>
		<b>WEEK 2</b>		
<b>2</b>	<b>5-8</b>	CELL CHEMISTRY	READ CMB 2.1-2.8 View PPT-02 ZOOM Q&A-02	Aug 31 <sup>st</sup>
		Elemental Composition		
		Atomic Bonding		
		Bonding in Macromolecules		
<b>3</b>	<b>9-10</b>	CELL TAXONOMY (sizes, components, composition)	READ CMB 1.3-1.7 ZOOM Q&A-03	Sept 2 <sup>nd</sup>
		Prokaryote-Bacteria		
		Prokaryote-Archaea		
		Eukaryote		
<b>4</b>	<b>11</b>	EUKARYOTIC ORGANELLES	READ posted URL	

Module	LO	Topics/Materials	Activities & Assignments	Date Due
			View PPT-04 ZOOM Q&A-04	Sept 4 <sup>th</sup>
			<b>HANDOUT B</b>	<b>Due Sept 7<sup>th</sup></b>
		<b>WEEK 3</b>		
		MLK DAY	<i>NO ZOOM</i>	<i>Sept 7<sup>th</sup></i>
<b>5</b>	<b>12-15</b>	MITOCHONDRIA & ENERGY		
		Laws of Thermodynamics	READ CMB 3.1-3.3	
		Aerobic Metab: INC yield Aerobic Metab: E Transformation	READ CMB 5.1-5.9 View PPT-05 ZOOM Q&A-05	Sept 9 <sup>th</sup>
<b>6</b>	<b>16</b>	Central Dogma of Molecular Biology DNA-RNA-PROTEIN	READ CMB 11.1-.19 View PPT-06 ZOOM Q&A-06	Sept 11 <sup>th</sup>
<b>7</b>	<b>17-18</b>	DNA PACKING	READ CMB 12.2-12.5 View PPT-07 ZOOM Q&A-07	Sept 11 <sup>th</sup>
			<b>HANDOUT C</b>	<b>Due Sept 14<sup>th</sup></b>
<b>8</b>	<b>19</b>	<b>WEEK 4</b>		
		RNA FORMS and FUNCTIONS	READ CMB 11.12-.18 View PPT-08 ZOOM Q&A-08	Sept 14 <sup>th</sup>
<b>EXAM</b>		<b>EXAM-01</b>	<b>Modules 1-8</b>	<b>Sept 16<sup>th</sup></b>
<b>9</b>	<b>20-23</b>	PROTEINS Primary Functional Molecule	READ CMB 2.8-2.12 View PPT-09 ZOOM Q&A-9	Sept 18 <sup>th</sup>
			<b>HANDOUT-D</b>	<b>Due Sept 21<sup>st</sup></b>
		<b>WEEK 5</b>		
<b>10</b>		PROTEIN Distribution <i>Cytoplasm</i> <i>Nucleus</i> <i>endoplasmic reticulum</i>	READ CMB 8.13 View PPT-10 ZOOM Q&A-10	Sept 21 <sup>st</sup>

Module	LO	Topics/Materials	Activities & Assignments	Date Due
		<i>endomembrane system</i>		
<b>11</b>		Regulating PROTEIN Activities <i>Phosphorylation</i> <i>Ca<sup>2+</sup> / Ca<sup>2+</sup>-Calmodulin</i> <i>Partial Proteolysis</i> <i>Ras family of Small GTPases</i>	READ posted URL View PPT-11 ZOOM Q&A 11	Sept 23 <sup>rd</sup>
<b>12</b>	<b>24-27</b>	MEMBRANES: Lipid Bilayers	READ CMB 4.1-4.3; 4.5-4.8 View PPT-12 Zoom Q&A-12	Sept 25 <sup>th</sup>
			<b>HANDOUT-E</b>	<b>Due Sept 28<sup>th</sup></b>
		<b>WEEK 6</b>		
<b>13</b>	<b>28-32</b>	MEMBRANE VESICLES	READ CMB 8.10-8.13 8.17-8.20 View PPT-13 ZOOM Q&A 13	Sept 28 <sup>th</sup>
<b>14</b>	<b>33-35</b>	MEMBRANE PROTEINS Transmemb spanning domains <i>Hydropathy Plots</i>	READ CMB 4.4-4.5 View PPT-14 ZOOM Q&A 14	Sept 30 <sup>th</sup>
<b>15</b>	<b>36-44</b>	TRANSMEMBRANE TRANSPORT		
		Active Transport or 'Pumps' Passive Transport Secondarily Active Transport	READ CMB 4.13-4.14 View PPT-15 ZOOM Q&A 15	Oct 2 <sup>nd</sup>
			<b>HANDOUT-F</b>	<b>Due Oct 5<sup>th</sup></b>
		<b>WEEK 7</b>		
<b>16</b>		Ion Channels <i>Electrochemical gradients</i> <i>Nernst Equation</i> <i>Goldman-Hodgkin-Katz Equation</i>	READ CMB 4.11, 4.15, 4.16 View PPT-16 ZOOM Q&A 16	Oct 5 <sup>th</sup>
<b>EXAM</b>		<b>EXAM 2</b>		<b>OCT 7<sup>th</sup></b>

Module	LO	Topics/Materials	Activities & Assignments	Date Due
		CYTOSKELETON		
17	51-52	Intermediate Filaments	READ CMB 9.9 View PPT-17 ZOOM Q&A 17	Oct 9 <sup>th</sup>
			<b>HANDOUT G</b>	<b>Due OCT 12<sup>TH</sup></b>
		<b>WEEK 8</b>		
18	45-50	<i>MT structures</i> <i>MT functions</i>	READ CMB 9.2 View PPT-18A ZOOM Q&A 18A	Oct 12 <sup>th</sup>
18		<i>MT motors</i> <i>Vesicle/organelle trafficking</i>	ZOOM Q&A 18B	Oct 14 <sup>th</sup>
19	53-60	Actin Filaments <i>Innate actin polymerization</i>	READ CMB 9.10 View PPT-19A ZOOM Q&A-19A	Oct 16 <sup>th</sup>
			<b>HANDOUT H</b>	<b>Due OCT 19<sup>TH</sup></b>
		<b>WEEK 9</b>		
		Actin Filaments <i>Actin associated proteins</i>	READ CMB 9.11-9.13 View PPT-19B ZOOM Q&A-19B	Oct 19 <sup>th</sup>
20	61-67	CELL MOTILITY		
		Five Steps in Cell Motility	READ CMB 9.11-9.16 View PPT-20 ZOOM Q&A-20	Oct 21 <sup>st</sup>
		Leading Edge: Lamellapodium <i>Arp2/3 + CapZ</i>		
		Leading Edge: Filopodium <i>Arp2/3 + Ena/VASP</i>		
		Spatiotemporal Regulation: Rho family small GTPases		

<b>Module</b>	<b>LO</b>	<b>Topics/Materials</b>	<b>Activities &amp; Assignments</b>	<b>Date Due</b>
		DIVISION, DEVELOPMENT & DEATH		
		CELL CYCLE Cyclins & CDKs	READ CMB 14.1-14.5 View PPT-21A ZOOM Q&A-21A	Oct 23 <sup>rd</sup>
			<b>HANDOUT I</b>	<b>Due OCT 26<sup>TH</sup></b>
		<b>WEEK 10</b>		
<b>21</b>	<b>68-74</b>	CELL CYCLE Mitosis/Cytokinesis	READ CMB 14.6-14.11 View PPT-21B ZOOM Q&A-21B	Oct 26 <sup>th</sup>
<b>22</b>	<b>75-</b>	STEM CELLS	READ CMB 1.6 View PPT-22 ZOOM Q&A-22	Oct 28 <sup>th</sup>
<b>23</b>		APOPTOSIS	READ CMB 15.17 View PPT-23 ZOOM Q&A-23	Oct 30 <sup>th</sup>
			<b>HANDOUT J</b>	<b>NOV 2<sup>ND</sup></b>
		<b>WEEK 11</b>		
<b>24</b>	<b>-96</b>	CELL SIGNALING		
		Endocrine paracrine autocrine Signaling in hypoxic tissues	READ CMB 15.1-15.2 View PPT-25 ZOOM Q&A-25	Nov 2 <sup>nd</sup>
		G-protein coupled receptors Enzyme coupled receptors	READ CMB 15.3-.12 View PPT-24 ZOOM Q&A-24	Nov 4 <sup>th</sup>
<b>25</b>	<b>97-100</b>	TISSUE TYPES	View PPT-25 ZOOM Q&A-25	Nov 6 <sup>th</sup>
			<b>HANDOUT K</b>	<b>Due NOV 9<sup>TH</sup></b>

<b>Module</b>	<b>LO</b>	<b>Topics/Materials</b>	<b>Activities &amp; Assignments</b>	<b>Date Due</b>
		<b>WEEK 12</b>		
<b>26</b>	<b>101-10</b>	'EPITHELIAL CELLS & TISSUES		
		Epithelial Organization	View PPT-26A ZOOM Q&A-26A	Nov 9 <sup>th</sup>
		Cell-Cell Junctions	READ CMB 7.7-7.13 View PPT-26B ZOOM Q&A-26B	Nov 11 <sup>th</sup>
		Transepithelial Transport	View PPT-26C ZOOM Q&A-26C	Nov 13 <sup>th</sup>
			<b>HANDOUT L</b>	<b>Due NOV 16<sup>th</sup></b>
		<b>WEEK 13</b>		
		<b>REVIEW</b>	<b>ZOOM Exam Review</b>	<b>NOV 16<sup>th</sup></b>
		<b>EXAM 3</b>		<b>NOV 20<sup>th</sup></b>

## **COVID-19 EMERGENCY SYLLABUS POLICIES AND PROTOCOLS**

The following classroom policies have been prescribed by the University of Mississippi during the Fall 2020 in response to the COVID-19 Emergency.

### **Classroom Health Requirements**

- Properly worn face coverings or face masks are required inside all University buildings. Face-to-face sessions will not proceed unless all present have properly worn face coverings or face masks. (Students who have a diagnosed health concern which interferes with the wearing of face coverings or face masks may contact the Student Disability Services (SDS) Office to seek a University-approved accommodation. Please contact SDS at <https://sds.olemiss.edu/> for more information.)
- Students and faculty must complete the daily symptom checker before any face-to-face class meeting.
- Students and faculty must quarantine for 14 days if they have a positive COVID-19 test, possible virus exposure, or display any symptoms related to COVID-19.
- Students with COVID-19 should seek medical attention at the Student Health Center and contact their instructor to let them know that they are sick, quarantined, or have some other health-related absence.
- If students test positive for COVID-19 at any health care facility, they must contact the Student Health Center at 662-915-7274. (Faculty and staff should contact the Employees Health Service at 662-915-6550.) University Health Services will coordinate contact tracing to lessen the likelihood of spread.
- Upon entering the classroom, students and instructors should use provided cleaning supplies to wipe down the surfaces that they will touch during the class.

### **Nonadherence with Health Requirements**

- Students have been informed of the COVID-19 guidelines for the school year (including face covering, social distancing, hand hygiene, etc.); therefore, students will not be allowed in classroom spaces when they are out of compliance with these guidelines.
- The University's Academic Conduct and Discipline Policy states that "disorderly behavior that disrupts the academic environment violates the standard of fair access to the academic experience." Failure to adhere to health requirements during the COVID-19 emergency will be deemed as disruptive to the classroom and will be enforced following the Academic Conduct and Discipline procedures.
- The University of Mississippi has adopted a tiered disciplinary protocol for nonadherence to COVID-19 health requirements. This disciplinary protocol is maintained by the Conduct Office of Conflict Resolution and Student (https://conflictresolution.olemiss.edu/). Office of Conflict Resolution and Student

## **Updated Contact Information**

The University must have accurate contact information, including cell phone numbers, to facilitate student communications and contact tracing. Students should check and update their University contact information (<https://olemiss.edu/mystudentprofile>). • \_

## **Attendance Policies**

Students attending the virtual component of hybrid, remote, or online courses are subject to the same attendance policy and procedures as traditional students. However, participation is defined in a different manner. The University's "Attendance Policy for Online Education" states: "Student attendance in online courses is defined as active participation in the course as described in the individual course syllabus." If students fail to meet online attendance requirements as stated in the syllabus, they will be given an absence. • \_

## **Student Support Resources**

• Students are encouraged to visit the University's Keep Learning site (<https://olemiss.edu/keeplearning/>) to access information and resources related to COVID-19 support. The site provides links to University student services to facilitate and support learning. • Students with diagnosed health concerns that may affect their compliance with COVID-19 health requirements should contact UM's Student Disability Services (SDS) Office (<https://sds.olemiss.edu>) to see if they are eligible for an SDS accommodation as soon as possible.

