Syllabus Biology 313- Cell Biology class, SPRING 2018

COURSE OBJECTIVES: BIOL 313 Cell Biology (3). A study of the structural and functional correlates in cell biology. Topics include membrane specialization, cytoskeleton structure and function of cellular organelles, adhesion, motility, mitotic mechanisms, transport mechanisms, immunology, and energetics. Lectures three hours per week

Prerequisite(S): **BIOL 111/BIOL 111L, BIOL 112/BIOL 112L, BIOL 211/BIOL 211D; + Chemistry (1 year)**

Co-Requisite(S) Or Prerequisite(S): **BIOL 305. CHEM 232 can be substituted for BIOL 211 and BIOL 305, MATH 250 or equivalent course in statistics or permission of instructor. *Courses:* Fall and Spring.**

COURSE OBJECTIVES AND LEARNING OUTCOMES:

This course focuses on the structure and function of cells. Specific topics include cell metabolism, membrane organization, organelles, compartmentation, membrane trafficking, the cytoskeleton, cell division, and cell signaling.

HOW TO DO WELL IN THIS COURSE:

- **Cell biology is a complicated subject and, therefore, attendance at lectures is required.**
- **Most of you are seniors and I will expect you to work hard, come to class prepared and study effectively for exams.**
- **I will expand on topics beyond what is covered in the text and you will be responsible for this material.**
- **Reading the text that is required.**

This is a detail-oriented course and you will not do well if you never read the book or research peer reviewed articles on specific topics. Lectures will make more sense if you read the text beforehand as well as OAKS notes.
If you must miss lecture, get the notes from a friend or from the website.
Don't make the mistake of skipping lectures because you can get the notes to read just before the exam – it DOES NOT WORKS, learning continually over time is the best strategy.

EXPECTATIONS: the below guidelines should create a comfortable and productive learning environment throughout the semester.

YOU CAN EXPECT FROM ME:

- To start and end class on time (09:30 – 10:20 am, M, W and F in HWWE 211) unless an emergency.
- To reply to e-mails within 24 hours on weekdays and 48 hours on weekends (and hopefully quicker).
- To assign homework that adequately covers the material and meets the learning objectives of the course.
- To give exams that accurately reflect the material covered in class and assigned in homework.
- To release the grades to you, at the best of my ability, within 1 to 2 weeks max. unless I am ill etc. but I do not have a TA and I do have 12 hours of teaching per week, so I grade as fast I can but also being accurate and unbiased, so no short cuts.
- To help all students in this classroom **who asks for help**. My advice for you, if you are struggling with understanding the course materials, is to set up a meeting with me or even a series of meetings, either alone or with a friend or 2 or 3 students, or e-mail questions, earlier rather than later, i.e. not later than the first exam or e-mail. I have many requests for urgent help from students within the last two to three

weeks before the end of the course begging for extra credit and the truth is that there is very little I can do to help these as it is simply way too late, as I have to give this extra credit to everyone in the course and even 20 points have no effect, so please seek help ASAP.

I CAN EXPECT OF YOU:

- To come to class on time (OK within 5 minutes late due to CARTA or rare times).
- To be attentive, engaged in class and ask many questions.
- The ready for quizzes +/- every class.
- To respect others in the classroom, and adhere to the rules of the honor code…. i.e. NO CHEATING.
- To refrain from using cell phones during the class time for messages etc. but these cell phones, plus laptops or I- Pads will be used with Socrative classroom quizzes.
- To spend an **adequate amount of time** on the homework each week (for **every 1 hour** in class is equivalent to **2 hours** at home but this equation was for BIOL-111 and now in BIOL-313, it can take even more time so, as to understand the biological concepts that are behind every aspect of Cell Biology, for answering quiz, exam or home-assignment correctly, it takes time ……
- To seek help when needed.
- To enjoy Biology and its fascinating interactions, not only in the classroom but for the rest of your life, if you really love Biology, you are already hooked.

QUIZZES: There will be either a class or OAKS per week (10 points) x 10 weeks ➔ a total grade of 100 points. I will try to have 12 quizzes in total so 2 can be dropped to sane your "worst" quiz numbers. I will also try to use Socrative for random questions in the classroom to judge the general understanding on certain topics of the class. We may also try Socrative for the real class quizzes as well but it depends on the strength of the Wi-Fi in HWWE 211.

EXAMS: There will be 3 exams at 100 points each.

Exam 1,	**M. February**	**12,**	**100 pts.**
Exam 2.	**W. March**	**14,**	**100 pts.**
Exam 3	**M. April**	**16,**	**100 pts.**

CUMULATIVE FINAL: Final, 150 points, 3 hours max. on Friday, April 27th in HWWE 211, starting at 8:30am.

CLASS POWER POINTS: As we have 41 students in this class (as of Jan 13^{h} 2018), there will be 10 short, 10-minute review power points, one per week for 10 weeks on various Cell Biology themes that are often not shown in details in the class's schedule. The presentations will be made of 5 students (i.e. 2.5 minutes per student ….) meaning each student in the class will talk for a few minutes before the class. The presentation will be worth 20 points, mainly on the presentation itself and 20 extra points in the form of a one-page summary of the talk and the biological theme in question that need to be posted on OAKS Dropbox. The list of the presenting students will be A to Z on the class list, 4 students at a time, and details for these presentation will be announced in class and on OAKS after the drop / add day. The students to present will be based on the alphabetical list of the class list, i.e. #1 for the first 5 students etc. and 4 students for all the remaining presentations.

The topics (in order as they follow the class progress during the semester) will be:

#1. DESCRIBE THE SURFACE AREA TO VOLUME RATIO CONSEQUENCES FOR CELLS AND BIOLOGY IN LARGE WITH MANY EXAMPLES

#2. DESCRIBE THE SIGNIFICANCE OF PROTEOSOMES AND CHAPERONES

#3. DESCRIBE THE MECHANISMS INVOLVED IN THE CENTRAL DOGMA OF BIOLOGY AND ALL ITS IMPLICATIONS AND DEMANDS.

#4. BRIEF DESCRIPTION OF MITOCHONDRIAL DISEASES AND EXAMPLES

#5. THE IMPORTANCE OF ENDOPLASMIC RETICULUM STRESS AND MISFOLDED PROTEINS

#6. BREIFLY DESCRIBE GOLGI DISEASES INCLUDING EXAMPLES.

#7. THE IMPLICATIONS FOR SITUATIONS LIKE *LISTERIA AND* OTHER HIDDEN MICROBES

#8. PLANT CYTOPLASMIC STREAMING AND ITS IMPORTANCE

#9. BRIEF DECRIPTION OF MICROTUBULE DISIEASES

#10. DESCRIBE BRIEFLTY THE DISEASES OF VESCICULAR ORGANELLES (LYSOSOMNES AND PERIOXISIMES).

#11. VERY BRIEF SUMMARY OF CELL SIGNALING. **More info. in class.**

Rules:
All sources from peer-reviewed articles, google images etc. must be documented with correct citations and you are not supposed to just copy classroom presented information.

Explore and widen your research to give a brief but thorough description of the topic than connects all the reasonable dots to created the "big picture

I hope these article searches will expand your horizons. Your report needs to be researched (and give details how you came to your topics / details).

COURSE TIMES: **MONDAY, WEDNESDAY, FRIDAY; 9:30 – 10:20 AM in Harbor Walk in HWWE 211.**
LECTURES: **January 8 2018 to April 23 2018, first and last days, respectively.**

HOLIDAY DAYS: **Jan. 15 2018, Martin L. King Day**
SPRING BREAK: Sun March 18 2018 – Sun March 25 2018
Classes resume: Mon March 26, 2018.
FINAL EXAM: **Friday, April 27 2018 in HWWE 211, starting at 8:30 am (or class discussion later).**

INSTRUCTOR: **Dr. Richard Southgate. PhD in Biology, University of Geneva, Switzerland, 1984.**

OFFICE: **HWWE (Harbor Walk West) 308, Harbor Walk, 360 Concord Street, Charleston SC 29401. As the official office Tel.: 843-953-7374 is not very reliable as I am only sometimes in this room to my teaching load, please communicate with me by e-mail: southgater@cofc.edu. I teach twelve hours in total, three hours in class BIOL-313 (HWWE) and nine hours at MUSC in three BIOL-313L laboratories and these 12 hours does not include extra time for lab. prep. lab. clean-up, buying life materials, grading (quizzes, exams, final, reports etc.), lecture prep. and quiz/exam preparations) and student questions / meetings etc., this means I am pretty busy.**

OFFICE HOURS: **Due to the time constrictions as listed above, and parking HWWE and MUSC, my official office hours are: Monday and Friday 10:30 am to noon in HWWE 308 but they can be changed due to multiple reasons like health (flu), car problems, caring for an elderly parent and as my wife and I have only one car, both working at CofC, so we have to plan who will be with the car between HHWE, SSMB and MUSC … and if this happens, I will post this new information on OAKS. Other times can be before or after the BIOL-313L labs., by e-mail, or if these times are not good for your schedule, set up an appointment (via by e-mail; southgater@cofc.edu) or even short questions after class/lab. sessions.**

TEXT BOOK: **"Molecular Cell Biology" by Lodish *et al.,* Version 8, April 1st 2016. Hardcover: 1280 pages; Publisher: W. H. Freeman; Language: English; ISBN-10: 1464183392; ISBN-13:978-1464183393,** Product Dim.: **8.8 x 1.8 x 11.4 inches; Shipping Weight: 5.7 pounds.**

POSSIBLE ALTERNATIVE TEXTS:
http://www.ncbi.nlm.nih.gov/books/NBK21475/?term=cell%20biology;
http://www.macmillanhighered.com/catalog/static/whf/lodish4e/ Molecular Cell Biology. 4th ed. Lodish H, Berk A, Zipursky SL, *et al.* New York: W. H. Freeman; 2000.

ALL COURSE WEBSITE INFORMATION: will be found on My Charleston, OAKS, CONTENTS: all are PDFs (due to space issues), + some Voice Thread videos, communications notes, notices, YouTube videos etc. and Socrative for class quizzes and OAKS quizzes etc. (see below). Socrative will be explained below. You are, therefore, responsible for ALL the information on OAKS/hand-outs/videos questions etc. in the Spring 2018 cell biology class, which will the basis for its quizzes, exams and final exam questions for your final grade.

SUMMARY: **QUIZ: 10 @ 10 questions, total: 10 X 10 = 100 points (plus potentially more….).**
●EXAM: 2 X 100 points = 300 points, FINAL: 150 points, Power Point Presentation: 50 points.

TOTAL: 100 + 300 + 150 + 50 = 600 POINTS.

Your FINAL GRADE is determined as a percentage (%) of your totally collected correct points of a maximum of 600 points. So a minimal A grade would be 92.9 % out of 100% etc. So 92.9% = an A-.

A	93-100	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	0-59

Please pick up your exam results! In every semester, there are several students who NEVER pick up ANY of their exams, and they have no clue what their overall grade is. You can discuss with me about your exam in the office hours, after lab. or by appointment via e- mail.

- **Quizzes will be 100 / 600 points i.e. ~16.7 % of the total grade.**
- **3 Exams will be 300 / 600 points i.e. ~50 % or 16.7 for each exam of the total grade.**
- **Cumulative final will be 150 / 600 points i.e. ~25 % of the total grade.**
- **The power point presentations will be 50 / 600 points i.e. ~8.3 % of the total grade.**

SOCRATIVE INSTRUCTIONS: My Socrative #room number is 360792 and you need their app. https://play.google.com/store/apps/details?id=com.socrative.student&hl=en, APP https://b.socrative.com/login/student/ login http://www.socrative.com/;

OAKS information will be in "Content" that contains pdf copies of class lectures, class notes as well as occasional voice thread and many videos. VOICE THREAD is available on OAKS. The first time you use it, you have to sign in with your student ID and password. More info: http://voicethread.com/about/features/. http://blogs.cofc.edu/tlttutorials/2016/02/09/socrative/

QUIZZES/EXAMS/FINAL.

- **During the exam, I will only answer clarification questions.**
- **Cell phones must be TURNED OFF (mine will be on for any important College notices) and they should be put away in bags, back packs, or purses during the exams and the final.**
- **Exams may consist of multiple choice, short answer, and/or essay questions. The questions will come from course material covered in class discussions, OAK PDFs, assigned readings, and from the integration of material from any homework assignments, cases, projects and exercises.**

****** STUDENTS WITH DISABILITIES who have the proper documentation through the CofC's SNAP services for extended exam times can take the exams at the SNAP office (assuming you want to use the additional time, if not you are welcome to take the exam with your classmates and as they will be on Fridays, you can finish the exam in my office [this not the case in the final, due to CofC policy]). Those students who will take their exams in the SNAP office must schedule their exams with them and inform me when they will be taken before the event.** See Center for Disability Services (SNAP) for more info. **http://disabilityservices.cofc.edu**

Please see me in class, lab. or my office to make sure you receive all the help by law. You also need to give me a copy of your official letter from the SNAP office.

STUDENT CONDUCT IN THIS COURSE IS GOVERNED BY THE CofC HONOR CODE:

Plagiarism misuse in exam essays etc. is NOT allowed PERIOD. It's a breach of respect, cheating and dishonesty to the instructor and every other student in this class and if caught, it can severely damage or even ruin your career… In summary, the negatives far outweigh the assumed positives, and think about your guilty conscious, yes you do have a conscious and these remorseful ideas can last a life time…., don't be tempted by the devil, it's just not worth it.
http://www.lib.usm.edu/legacy/plag/plagiarismtutorial.php
http://studentaffairs.cofc.edu/honor-system/faqs.php
http://jinr.people.cofc.edu/honorcode.pdf
http://studentaffairs.cofc.edu/honor-system/index.php

CELL BIOLOGY Spring 2018

ATTENDANCE POLICY:

Students are expected to **ATTEND ALL CLASSES**.

Non-urgent/non-emergent situations (i.e. wedding, medical and/or counseling appointments, etc.) should be addressed by the student during times that do not interfere with the student's course schedules, just as of you were seeking time off from an employer….

In the event that a student misses a class with a legitimate, documentable reason, that student may bring documentation to the Absence Memo Office located at 67 George Street (between Stern Center and Glebe Street) where the student may fill out a form with a schedule of missed class(es), dates missed, etc. A representative from the Absence Memo Office will notify the appropriate faculty by E-mail.

Any missed assignments, class work, papers, tests, etc., are to be arranged between the professor and the student. It is important to note that the only individual who can authorize an excused absence is the professor of the missed class. http://studentaffairs.cofc.edu/about/services/absence.php

If a student is ill or has a tragedy or any health issues etc. and cannot come to a regular classroom, these students with proof (doctor's note etc.), I will make arrangements to make up any quizzes/exams and I will help that student as must I can to catch up but remember, any student with 4 unexcused classes in this class is a candidate for WA…. I really hope we never get to this point but to be sure, attendance checks will be frequent by socrative. Any athletics in the Cell Biology class have to show me their official schedule if you are away on that class and if not they will be labeled as non-excused.

I will take random attendance throughout the semester and the weekly class quizzes automatically creates an attendance list. If I see you have not been in the classroom and without an excuse, I will e-mail you after 3 times to have a meeting with you, and after I have documented non-attendance after 4 classes with no excuse(s), I have the right to give you a WA, something I clearly do not like this chore at all but it's your choice.
http://facultysenate.cofc.edu/archives/2010-2011/oct-5-10/senate-minutes-oct-2010
http://blogs.cofc.edu/parents/2011/02/04/missing-classes-excused-absences-policy/

The college also has a Statement on Religious Accommodation for Students
http://president.cofc.edu/community-relations/rlc/accommodation.php, **if one of these religious days / events are in conflict with a class or lab. activity, please let me know.**

The College of Charleston's Calendar for Spring 2018. http://registrar.cofc.edu/pdf/ac-2018spring.pdf

Modified Spring 2018 Academic Calendar, Dates in the calendar are subject to change without notice.	
January 2018	
Monday, January 8	Spring full semester and Express I classes begin.
Monday, January 15	Martin Luther King, Jr. Holiday, observed. No classes. College closed.
Tuesday, January 16	Last day of Drop/Add for full semester classes.
Tuesday, January 30	Attendance Verification for faculty opens in MyCharleston via Final Grades.
February 2018	
Thursday, February 1	Last day to submit an Undergraduate Application to Graduate in Spring 2018.
Saturday, February 3	Designated Storm Make-Up Day (SD).
Tuesday, February 6	Attendance verification for faculty closes at noon.
Tuesday, February 20	Undergraduate missing and incomplete grades for Fall 2017 convert to a grade of "F".
	Full semester Mid Term and Express I final grading open to faculty.
March 2018	
Tuesday, March 6	Full semester Mid Term and Express I final grades due at noon.
Wednesday, March 7	Full semester Mid Term & Express I final grades available to students on MyCharleston by this date.
Tuesday, March 13	Last day for students to withdraw with a grade of "W" from full semester classes. NOTE: Holds placed by the Treasurer's Office will prohibit students from being able to withdraw in Banner Self-Service. Students should settle the hold with the Treasurer to be able to withdraw online or contact the Registrar's Office by this deadline to withdraw.
	Maymester and Summer Sessions registration begins for CofC's students.
Wednesday, March 14	Fall 2018 early registration begins based on earned hours. NOTE: Holds will prohibit students from being able to register. Students should settle holds with the office that placed the hold **before** their opportunity to register.
Sun, Mar 18 - Sat, March 24	Spring Break.
Monday, March 26	Classes Resume.
April 2018	
Monday, April 9	Spring 2018 full semester and Express II course-instructor evaluations open.
Tuesday, April 10	Last day for students to withdraw with a grade of "W" from Express II classes. NOTE: Holds placed by the Treasurer's Office will prohibit students from being able to withdraw in Banner Self-Service. Students should settle the hold with the Treasurer to be able to withdraw online or contact the Registrar's Office by this deadline to withdraw.
Monday, April 23	Last day of full semester and Express II classes.
Tuesday, April 24	Reading Day / Designated Storm Make-Up Day (SD).
	Full semester and Express II grading open for faculty.
Wednesday, April 25	First day of full semester and Express II final exams.
May 2018	
Wednesday, May 2	Last day of full semester and Express II final exams.
	Spring 2018 full semester and Express II course-instructor evaluations close at midnight.
Thursday, May 3	Graduate missing and incomplete grades for Fall 2017 convert to a grade of "F".

Monday, May 7	Full semester and Express II final grades due at noon. Faculty must submit a Change of Grade form after the noon deadline.
	Final grades for full semester and Express II classes available to students on MyCharleston after 5 p.m.
July 2018	
Friday, July 6	Last day for students to submit incomplete undergraduate coursework to faculty for any Spring 2018 class (Spring 60 Day Deadline). Change of grade form to be submitted by faculty.
Friday, July 13	Undergraduate missing and incomplete grades for Spring 2018 sessions convert to a grade of "F".

SD - Storm Day Makeup (no classes unless college deems necessary)
Note: Consistent with all applicable laws, any weekend day or designated holiday may be used as a storm makeup day in the event of an inclement weather cancellation of classes.

Last updated: 11-10-2017

The Spring 2018 exam schedule http://registrar.cofc.edu/pdf/exam-schedule-spring2018.pdf

Spring 2018 Exam Schedule (Subject to Change)

Exam Times	Wednesday April 25	Thursday April 26	Friday April 27	Saturday April 28	Sunday April 29	Monday April 30	Tuesday May 1	Wednesday May 2
8:00am-11:00am	MWF 8:00am 8:30am	TR 9:25am 9:55am	MWF 9:00am 9:30am	TR 8:00am 8:30am	Reading Day 8:00-4:00pm	MWF 10:00am 10:30am	TR 10:50am 11:20am	MWF 7:30am
12:00pm-3:00pm	MWF 1:00am 1:30am	TR 12:15pm 12:45pm	MWF 11:00pm 11:30pm	Math all 101,111 Exams		MWF/MW 2:00pm 2:30pm	TR 1:40pm 2:10pm	MWF 12:00pm 12:30pm
4:00pm-7:00pm	MWF/MW 4:00pm	TR 7:05am	MWF 3:00pm 3:30pm MW 3:25pm	H	Online Final Exams	E	TR 3:05pm 3:35pm 4:00pm	F
7:30pm-10:30pm	D	I	A	B		C	J	G

NOTE: Examinations must be taken at the time scheduled. For exceptions to this rule, please refer to the Final Examinations section of the academic catalog. Forms for permission to reschedule one exam are located on the Student Academic Forms channel on the Academic Services tab in MyCharleston.

THIS IS A VERY TENTATIVE SYLLABUS for CELL BIOLOGY, Biol-313-01 in Spring 2018.

All notes PDFs of the lectures and the notes will be posted on OAKS, as well as any Voice Thread notes			
WEEK 1 **Jan 8, 10, 12**	**First class. Brief Syllabus and Course information, plus** **Intro: a reminded of Biol-111 + major CB concepts** **Intro 2, READ CHAPTER 1, Intro notes,**		
WEEK 2 **Jan. 15, 17, 19** **Jan. 16**	**MLK Holiday, No classes on Jan. 15 2018** **Last day for students to Drop/Add Spring 2018,** **Biological related Chemistry** **Biological related Chemistry cont.**	 **2.1** **2.1,2.2,2.3, BC note**	 **Q1**
WEEK 3 **Jan. 22, 24, 26**	**Basic macromolecules** **Protein structure,** **Protein domains + motifs**	 **3.1, Protein note** **3.2**	 **Q2** **PPT #1**
WEEK 4 **Jan. 29, 31, Feb 2**	**Membrane Organization,** **Proteins within membranes,** **Transport across membranes,**	**7.1, 7.2, Ch. 7 note** **7.2, 7.3** **11.1, 11.2, 11.3, 11.4, 11.6**	 **Q3** **PPT #2**
WEEK 5 **Feb. 5, 7, 9**	**Bioenergetics, ATP, Enzymes** **Metabolism Chap 12, Glycolysis** **Metabolism and Mitochondria**	**Fig.3.3, Fig. 3.35** **2.1, Ch. 12 note** **12.1, 12.2**	 **Q4** **PPT #3**
WEEK 6 M Feb. 12 **Feb. 12, 14, 16**	**EXAM 1 (Intro, Biological chemistry, Macromolecules, Proteins, Membranes** **(Ch. 7 and 11) and Biogenetics, ATP and enzymes.** **Metabolism, Citric acid cycle / Krebs cycle** **Mitochondrial Electron transport chain**	 **12.3** **12.4**	 **Q5** **PPT #4**
WEEK 7 **Feb. 19, 21, 23**	**Mitochondria ATP synthase** **Chloroplasts and photosynthesis** **Chloroplasts and photosynthesis 2**	**12.5** **12.6, 12.7, PS note** **12,7, 12.8**	 **Q6** **PPT #5**
WEEK 8 **Feb. 26, 28, Mar. 2**	**Simple cell signaling/transduction** **Simple cell signaling/transduction 2** **Transcription**	**Chap 15*, note** **Chap 16*, note** **5.1, 5.2, DNA + TRANSCRIPTION note**	 **Q7** **PPT #6**
WEEK 9 **Mar. 5, 7, 9**	**Transcription 2** **Transcription 3 and Translation** **Moving Proteins into membranes and organelles Endoplasmic reticulum,** **Signal hypothesis**	**5.3** **5.4, TRANSLATION note** **13.1, Chap 13 note**	 **Q8** **PPT #7**

WEEK 10 **Mar. 12, 14, 16** **W Mar. 14**	**Moving Proteins into membranes and organelles thru the Endoplasmic reticulum,** **Signal hypothesis** **13.1, Chap 13 note** **EXAM 2 (Bioenergetics, metabolism, ATP, Enzymes, Glycolysis, Citric acid cycle, Electron transport chain, Photosynthesis, signaling, transcription).**
WEEK 11	**SPRING BREAK, MAR. 18 TO MAR 25**
WEEK 12 **Mar. 26, 28, 30**	**Endoplasmic reticulum** **13.2, 13.3** **Moving Proteins ➔ into membranes/organelles: Mitochondria, Chloroplasts, 13.4,** **Chloroplast 2 and peroxisomes** **13.5** **Nucleus traffic** **13.6** **Q9** **PPT #8**
WEEK 13 **Apr. 2, 4, 6**	**Nucleus traffic 2 and the Golgi apparatus** **13.6, 14,1, 14.2, 14.3, Golgi note** **Vesicle transport and secretion (Clathrin and lysosomes) 14.4, 14.5, 14.6** **Cytoskeleton-microfilaments** **17.1, 17.2, Actin note** **Q10** **PPT #9**
WEEK 14 **Apr. 9, 11, 13**	**Cytoskeleton-actin/microfilament dynamics** **17.3, 17.4** **Cytoskeleton muscles** **17.5, 17.7, 17.8** **Intermediate filaments** **18.7, IF note** **Extra Cellular Matrix** **Q11** **PPT #10**
WEEK 15 **Apr. 16, 18, 20**	**Microtubules** **18.1, 18.2, 18.3,18.4, 18,5, MT note** **EXAM 3 (translation, ER, Golgi, Actin / Microfilaments, Microtubules Intermediate filaments and Extra Cellular matrix.** **Q12**
M Apr. 23, 2018	Mitosis
Apr. 24th	**READING DAY, hopefully in HWWE 211, times to be determined by class vote.**
Apr. 27th	**FINAL exam, covering everything we looked at in the last 3 months in HWWE, 150 pts. HWWE 211, 8:30 AM, 3 HOURS.** **See the modified academic calendar for other dates.**

- **If you see a mistake in this syllabus, please let me know, thanks.**
