

# BIOL/BCHM 536 Biological & Structural Aspects of Drug Design and Action

Spring, 2020  
MWF 9:30 to 10:20 am  
Biochemistry Building Room 102

## Course Instructor

**Professor Andrew Mesecar**

Office: BCHM 120 and HOCK 311

Phone: 494-1924

Email: amesecar@purdue.edu

Office Hours:

MW: 8:00am - 9:00am

or by appointment

## Teaching Assistant

**Brandon Anson**

Office: HOCK 221/230

Phone: 765-404-7712

Email: banson@purdue.edu

Office Hours:

TWR: 3-4:00pm

or by appointment

## Course Description

This course will provide a general overview of the modern-day drug discovery pipeline process and an in-depth look at the basic biology, structure, and mechanisms-of-action behind currently marketed therapeutics. The course will start with a historical account of the discovery of natural product drugs such as aspirin and penicillin and will then venture into the modern-day era of the drug discovery pipeline with an emphasis on the general principles of target selection, assay development, high-throughput screening and structure-based drug design. We will explore different classes of antibiotics, antiviral, and anti-cancer drugs and their interactions with molecular targets. The majority of the course will be on small molecule drugs with some examples of modern biologics-based drugs near the end of the semester. Students will learn the fundamental properties of protein structure, enzyme kinetics and mechanisms, and will then learn how to apply these principles to drug interactions and design.

## Prerequisites

BIOL 23100 or 23000 and CHM 25600 or 26605 or MCMP 20500. **Note:** A course in Biochemistry such as BCHM 36100, 46200 or CHM 53300, and/or a course in Structural Biology such as BIOL 39500 (Macromolecules), BIOL 44207 or BCHM 46300 is helpful but not required.

## Course Goals & Outcomes

As part of the general course outcomes for the Department of Biochemistry, which is also applicable to all students, the following outcomes are expected for students taking BCHM/BIOL 536.

1. Biochemistry students will understand the molecule principles of life based on the core disciplines of biology, chemistry and physics.
  - a. Able to describe the chemical structures of the building blocks of biological macromolecules, including amino acids, nucleotides, sugars and fatty acids. (BL4, E, H, Q, CD)
  - b. Demonstrate knowledge of the higher order structures of proteins. (BL4, E, H, Q, CD)
  - c. Understand the principles of enzyme catalysis and regulation. (BL4, E, H, Q, CD)
2. Biochemistry students will communicate scientific knowledge, experiments and conclusions effectively as speakers and writers.
  - a. Describe research projects in an oral presentation that can be readily understood by a general scientific audience (BL4, OP, PR, WR)
3. Biochemistry students will acquire information literacy: the ability to locate, evaluate, and utilize information in the disciplines of biochemistry and molecular biology that is required for research, data analysis, and communication. (BL6, OP, PR, WR)
4. Biochemistry students will appreciate the ethical issues facing professionals in the life sciences.
  - a. Understand scientific ethical principles of research including scientific honesty, experimental rigor, intellectual freedom, openness, the principle of credit and the principle of public responsibility. (BL4, CD)
5. Biochemistry students will understand the contributions of our discipline to society, including improvements to medicine, agriculture, the economy and the environment. (BL4, CD)

**Note:** BL refers to the Bloom's level of taxonomy, which is a measure of cognition. BL2=knowledge and comprehension, BL4=application and analysis, BL6=synthesis and evaluation. The other symbols refer to the mode of assessment in each course. E=exam, H=homework, LR=lab report, Q=quizzes, CD=class discussion, OP=oral presentation, IR=instructor review, PR=peer review and WR=written report.

In addition to the outcomes above, students in the course will be able to do the following;

From the biological/pharmacological aspects\* of drug action, students will be able to:

1. understand and communicate the sites and mechanism-of-action of a drug
2. understand and communicate the relationship between the pharmacologic mechanism and the therapeutic use of a drug
3. understand and communicate the scientific basis for the therapeutic use of a drug

From the chemical/structural aspects\* of drug action, students should be able to:

1. predict, verbally or in writing, the biological response, if any, from a given chemical structure
2. communicate and describe the relationship between the structural features of a compound and the physicochemical properties that might influence biological response or the design of new agents
3. predict, verbally or in writing, the biochemical mechanism-of-action of a biologically active substrate or compound from its chemical structure
4. communicate and describe the relationship between the chemical structure of a biologically active compound and the receptor or active binding site, using enzyme or receptor models
5. predict, verbally or in writing, the biological response resulting from the chemical alteration or biochemical pathways
6. understand and communicate the relationship between *in vitro* reaction mechanisms and the structural features that alter the *in vivo* biotransformation of a drug

From the therapeutic aspects\* of drug action, students should be able to:

1. describe the pathophysiologic processes associated with a particular disease state, and how they might be affected by drug therapy

\*NOTE: structures, compounds, drugs, & disease state therapeutics refer to those discussed within this course or as part of a homework assignment, reading assignment or course project.

## Required Texts

For the Spring 2020 semester, there are no required textbooks to purchase. Every attempt will be made to provide students with reading material electronically, in print form, or on reserve in a library.

### **Material from the following books will be utilized:**

Evaluation of Enzyme Inhibitors in Drug Discovery: A Guide for Medicinal Chemists by Robert A. Copeland

Enzymes: A practical Introduction to Structure, Mechanism and Data Analysis by Robert A. Copeland.

General Biochemistry Text Books.

## Primary Literature Reading Assignments and Utilization

This course utilizes a number of peer reviewed papers from the primary literature in addition to review articles. We will utilize various journal articles throughout the course as reading material to fill in your knowledge, as discussion material for class or as part of your team assignment.

You will need to heavily utilize the primary literature and material available via the internet for your final project. You will need to gather the appropriate material on your enzyme drug target, interpret and analyze the data available, and then present it in your final oral presentation to argue your case. You will also need to utilize these references in your final written proposal.

## Lecture Notes and Other Paper Handouts

Due to the tuition freezes at Purdue and the necessary budget cuts to implement these freezes, the Departments have put a ban on distribution of any printed material with the exception of the Course Syllabus, Quizzes and Exams. Students are responsible for bringing notes (printed or electronic) to class for annotation during lecture. Lecture notes and material will be uploaded to Black Board ~1 day prior to the lecture.

## General Course Policies

1. Students are required to attend class and actively participate in each scheduled lecture, group activity, quiz or examination at the time specified.
2. The Course Instructor and Teaching Assistant(s) will inform you of their office hours. Questions concerning lecture content should be discussed directly with the given lecturer during classroom time or at a mutually agreed upon time. All other questions, including any questions concerning grading, should be discussed with the Course Instructor.
3. All examinations and quizzes are closed notes, closed book and closed smart phone unless stated otherwise by the instructor. For quizzes and exams that require calculations, a standard scientific calculator that is unable to connect to the internet (no Wi-Fi, no 3G/4G/5G or Bluetooth connections etc.) are to be used.
4. All requests for corrections to an exam, quiz, homework or project score should be made to the Course Instructor within **5 class days** after your exam, quiz, homework or project score has been returned to you. You will have 5 class days after the start of the summer term for requests for corrections in the final examination score. It is your responsibility to notify the course instructor of any grading error. No correction of any error in addition or subtraction will be made after the final grade has been submitted.
5. **Make-up examinations will be given only for an excused absence.** Any student who misses an exam must notify the Office of the Dean of Students of his/her absence prior to the scheduled examination to obtain an excused absence from the instructor/course coordinator. Failure to comply with this policy will result in a score of a zero for the missed examination. **The course instructor will set the day and time of the make-up examination.**
6. **Make-up Quizzes, Homework or Team Projects.** You will not be allowed to make-up quizzes or homework assignments if you miss them or fail to hand them in at the specified or scheduled class date and time. If you are unable to attend class to hand in a homework assignment, you must arrange to have the homework assignment delivered to the Course Instructor or Teaching assistant **before** the scheduled due date and time. One lowest, or missing, quiz or homework score will be dropped from the final calculation of each student's final grade. Make-up times, dates, etc. on Team Projects will not be allowed. Missed presentations or late submission of written proposals or projects will receive a grade of zero.
7. **Academic Dishonesty**, as defined in the Purdue University "Academic Integrity: A Guide for Students" <https://www.purdue.edu/odos/academic-integrity/> will not be tolerated. Students caught cheating will, at a minimum, receive a zero or letter grade of F for the assignment. The student may also receive a grade of an F for the course. Additionally, the circumstances surrounding the event will be reported to appropriate administrative officials for further action [https://www.purdue.edu/odos/osrr/resources/documents/responding\\_to\\_academic\\_dishonesty.html](https://www.purdue.edu/odos/osrr/resources/documents/responding_to_academic_dishonesty.html)
8. The course instructor reserves the right to make alterations in the course schedule at any time for new course material, snow days etc.

### **Purdue's Honor Pledge-Written by Purdue Students!**

You can use this link to a web page for [Purdue's Honor Pledge](#)

*“As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue.”*

### **Policy on Student Conduct**

Purdue University has a formal description of the “Purdue University Student Conduct Code” that can be found on the Office of the Dean of Students website in the section of Office of Student Rights and Responsibilities.

*Students are responsible for observing the policies, rules, and regulations of Purdue University. These, in general, state the expectation that Purdue students will at all time conduct themselves as responsible citizens. Failure to show respect for duly established laws or University regulations will be handled by the Office of Student Rights and Responsibilities in conformance with the various policies and regulations.*

Additional details can be found at the website which is:

[http://www.purdue.edu/studentregulations/student\\_conduct/regulations.html](http://www.purdue.edu/studentregulations/student_conduct/regulations.html)

Students in Biological & Structural Aspects of Drug Design and Action are expected to behave in a civil fashion toward instructors, staff, and their fellow students. Sometimes we fail to realize that our behavior disrupts or offends others. It is important to be sensitive to the goals and feelings of your instructors and classmates.

Please attend to the business of the class while in the classroom. It is rude to talk with a friend, read a newspaper, or engage in non-class activities during class. Help to build a good classroom environment by being a supportive listener and making relevant contributions to the topics being discussed. Please make every attempt to arrive in the classroom and be prepared for lecture and/or recitation at the proper time. Walking in after the bell has sounded and the lecture and/or recitation have begun disrupts the other students and the faculty. Please be courteous at all times.

### **Policy on Diversity and Nondiscrimination**

In accordance to Purdue's [Nondiscrimination Policy Statement](#), BIOL/BCHM 536 Students, Teaching Assistants and Instructors will be committed *“to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential”*. In addition, in pursuit of our goal of academic excellence in BIOL/BCHM536, Students, Teaching Assistants and Instructors will seek to develop and nurture diversity. Purdue University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life and BIOL/BCHM536 will be a reflection of those values. For more information, please see [http://www.purdue.edu/purdue/ea\\_eou\\_statement.html](http://www.purdue.edu/purdue/ea_eou_statement.html).

*Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran. The University will conduct its programs, services and activities consistent with applicable federal, state and local laws, regulations and orders and in conformance with the procedures and limitations as set forth in Purdue's Equal Opportunity, Equal Access and Affirmative Action policy which provides specific contractual rights and remedies. Additionally, the University promotes the full realization of equal employment opportunity for women, minorities, persons with disabilities and veterans through its affirmative action program.*

### **Anti-Harassment Policy**

Strictly following and interpreting existing University Policy: *Purdue University is committed to maintaining an environment that recognizes the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding and mutual respect; and encourages its members to strive to reach their potential. The most effective way to work toward preventing Harassment is through education that emphasizes respect for every individual.*

### **Students with Disabilities**

Purdue University is required to respond to the needs of the students with disabilities as outlined in both the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 through the provision of auxiliary aids and services that allow a student with a disability to fully access and participate in the programs, services, and activities at Purdue University.

*If you have a disability that requires special academic accommodation, please make an appointment to speak with me within the first three (3) weeks of the semester in order to discuss any adjustments. It is important that we talk about this at the beginning of the semester.*

It is the student's responsibility to notify the Disability Resource Center <http://www.purdue.edu/studentsuccess/specialized/drc/> of an impairment/condition that may require accommodations and/or classroom modifications. Students with disabilities can find more information on available resources at the Disability Resource Center (DRC) website.

### **Counseling and Psychological Services (CAPS) Information**

Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at (765)494-6995 and <http://www.purdue.edu/caps/> during and after hours, on weekends and holidays, or through its counselors physically located in the Purdue University Student Health Center (PUSH) during business hours.

### **Policy on Class Attendance**

BIOL/BCHM 536 will follow the guidelines on attendance provided by Purdue University;

<http://www.purdue.edu/advocacy/students/absences.html>. Students are expected to be present for every meeting of the class. **Only the Course Instructor can excuse a student from classes or course responsibilities.** In the event of an illness, accident, or emergency, when circumstances permit, students should make direct contact with the Course Instructor, preferably before a class or an exam takes place. If the instructor cannot be reached in person or by telephone, the student should leave a message in the instructor's department mailbox or with the instructor's administrative assistant.

When a student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control, the student or the student's representative should contact the Office of the Dean of Students if the reported absence is expected to be for an extended period of time (**normally more than five days**). A member of the Dean of Students staff will notify the student's instructor(s) of the circumstances. Only the instructor may excuse class absences. The student should be aware that this intervention does not change, in any way, the outcome of the instructor's decision regarding the student's academic work and performance in any given course. The student must make personal contact with the instructor(s) as soon as it is possible to do so. The student may discuss the circumstances of the absence with a member of the Office of the Dean of Students for advice on how to proceed.

If a student will be absent for **more than five days**, has not been able to reach the instructor in person or by telephone, or through leaving notification of the student's circumstances with the instructor's secretary, the student or the student's representative should notify the Office of the Dean of Students, at **765-494-1747** as soon as possible after becoming aware that the absence is necessary. Be advised, the student, or the student's representative may be asked by the instructor(s) to provide documentation from an authorized professional or agency which supports an explanation for the student's absence.

*As an incentive, students who attend ~90% of the lectures will be invited to Professor Mesecar's house for an end of the semester party. This party will likely take place the weekend before finals, usually Sunday evening. Daily attendance sheets will be distributed at each lecture. Since the first time I created and taught this course in the spring of 2011, there has been a strong correlation between the number of lectures missed by a student and their point total (and final grade) for the semester. The more you miss this class, the more points you tend to miss on quizzes and exams. This trend has been consistent since 2011 and I therefore expect this year to be no different.*

### **Arrive to Class On-Time**

You are expected to arrive to class on time. Exams will start promptly at 9:30 am and quizzes are often given right at 9:30 am also. You will NOT be given any extra time if you are late. No exceptions. Homework is often collected at the beginning of class also. If you are not there to turn in your homework when collected it will be considered late and will not be counted. It is not my problem that another professor goes over time with his/her lecture before BIOL/BCHM 536, if you are slow walking to class because you have to talk to someone on a cell phone between classes, or if parking is inconvenient. You need to find a way. If you



have a documented handicap or have sustained a temporary injury (ruptured Achilles-happened to me one year, broken leg etc.) that is documented by a health care professional then appropriate accommodations will be made.

**Policy on Distribution of Course Material from BCHM/BIOL536: No Material or Notes from this Course Should be posted on Commercial Websites**

You are not allowed to distribute any course material given to you in class, out of class, or via email or Blackboard etc. to any other entity or posted on Websites such as Course Hero, Chegg, or Quizlet etc. In general, notes are “considered to be ‘derivative works’ of the instructor’s presentations and materials, and they are thus subject to the instructor’s copyright in such presentations and materials.” As such, they cannot be sold or bartered without your express written permission. See the policy with regard to commercial note taking in classes that you may wish to include in your syllabus ([see part J of the Purdue student misc. conduct regulations](#)).

**BIOL/BCHM 536 COURSE MATERIAL DISTRIBUTION AGREEMENT**

I, \_\_\_\_\_ fully understand that I am NOT to:  
(PRINT STUDENT’S NAME)

distribute, post, upload to the internet or email any of the course material provided to me by my instructor in class, out of class, via email or BlackBoard. I understand that this material is provided to me for use in BIOL/BCHM 536 and that it is not to be made available to the public or any company or commercial entity unless I obtain written permission by my course instructor, Professor Andrew Mesecar, and Purdue University. I understand that all material provided to me is property of Purdue University and that it is subject to certain Copyright laws. I also understand that if it is found that I have provided course information and material to any person or entity without permission that my course grade can be changed to an F even after I graduate.

Student’s signature \_\_\_\_\_ Date \_\_\_\_\_

**Policy on Taping or Recording of Lectures in BCHM/BIOL536:**

In general, you are not allowed to record any of the lectures via any electronic format (voice or video recorders, cell phones etc. The lectures will be recorded for you via BoilerCast or the Course Instructor and edited if necessary. These recordings will be posted on Blackboard within 1 week of the lecture. However, if necessary, the procedure for taping/recording lectures in BIOL/BCHM 536 is as follows:

A student can only record a class for personal use if they do all of the following:

1. Obtain written consent (see Consent Form below) of the faculty member lecturing BEFORE the student tapes the lecture (this protects the student from having somebody say later that they didn't give permission); the consent needs to be signed by the student and indicate that it is only for personal use and it won't be posted on the internet; a copy of the form should be kept by the student and given to the faculty member.
2. Use the recorded material solely for their own use; lecture cannot be duplicated and given to other class members.
3. Recorded material cannot be posted on the internet or disseminated in any way.

=====

**BIOL/BCHM 536 LECTURE RECORDING CONSENT FORM**

I \_\_\_\_\_ permit \_\_\_\_\_  
(PRINT LECTURER'S NAME) (PRINT STUDENT'S NAME)

to record lecture material from BIOL/BCHM 536.

I understand that:

§ recordings will be used solely for personal note-taking purposes without being duplicated and/or distributed to other individuals;

§ recordings will not be posted on the internet or unlawfully distributed in any other public forum.

Lecturer's signature \_\_\_\_\_ Date \_\_\_\_\_

Student's signature \_\_\_\_\_ Date \_\_\_\_\_

## GRADING

### Tentative Plan Course Point Distribution:

<b>First 1-Hour Examination:</b> Covers X lectures @ 10 to 15 pts each	~130
<b>Second 1-Hour Examination:</b> Covers Y lectures @ 10 to 15 pts each	~140
<b>Third 1-Hour Exam:</b> Covers Z lectures @ 10 to 15 pts each	~130
<b>Final Examination</b> Cumulative ( <i>may be optional- will depend on course performance</i> )	200
<b>Announced and Pop Quizzes:</b> 3 to 5 @ 10 to 15 pts each = 30 to 90 pts	30 to 90 pts
<b>Homework</b> 3 to 5 @ 10 to 15 pts each = 30 to 75 pts	30 to 75 pts
<b>Student Team Projects and Presentations:</b> Written Proposal (50), Presentation (100), Team Member Evaluation (25) Peer-Evaluation (25)	200
<b>Lowest Quiz or Homework Score Dropped</b>	-10 or -15
<b>Total Points for this Course:</b>	850 - 950

### Examinations:

There will be at least three (3) examinations and one (1) two-hour cumulative final examination. Regular exams will be given during our scheduled class hour. This gives us flexibility in scheduling the day of the exam and it eliminates evening scheduling conflicts. Therefore, all students will be able to take the examinations without excuses.

### Type of Examination Questions:

In general, problem-solving questions requiring short, concise answers that may involve chemical structures, models for drug-receptor/enzyme interactions and therapeutic applications will be given. In addition, matching and/or multiple-choice questions will also be used. In general, about 10 to 15 points will be assigned per lecture to arrive at the amount of points assigned to each exam.

### Quizzes (Scheduled and Pop):

We will have a few scheduled or unscheduled "Pop" quizzes throughout the semester. The final number is not set at this point and will depend on class progress.

### Homework

We will have at least 3 homework problem sets during the semester, but more may be given depending on the academic needs of students.

## **Team Proposal Project**

We are going to have a team project where each team of 3 to 4 students will select a potential drug target and then “sell” their idea to develop this target to a scientific board of a fictitious pharmaceutical company. The enzyme target will not yet have a marketed therapeutic developed, but there will be enough biological and lead discovery data on the target to enable its further development. It will be the goal of each project team to convince the company that their target is the best one to move forward in the development pipeline. Only 1 or 2 of these targets, depending on the class size, will be selected to move forward. A written proposal and presentation will be required. Individual team member assessments will be performed by each team member, and presentations will be peer-reviewed. More details will follow.

## **Grading System**

A minimum of 60% of the total points is required to guarantee that you will receive a passing grade of a D. All students achieving 90% or above of the total points will receive an A for the course. Grades of B and C will be assigned by the instructor/course coordinator for students receiving above 80% and 70% respectively. Plus (+) and minus (-) may also be assigned to grades based on final percentages. The final cut-off for each grade will be determined based on the overall performance of the class.

## **Academic Integrity & Dishonesty**

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing [integrity@purdue.edu](mailto:integrity@purdue.edu) or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

Academic Dishonesty will not be tolerated. BIOL/BCHM536 will adopt and abide by the rules and policies of Purdue University for Academic Dishonesty

*Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, University Regulations] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972]*

Please read a “Guide for Students” on Academic Integrity which can be found at the following website <http://www.purdue.edu/odos/osrr/academic-integrity/index.html>

## **Plagiarism**

There are few intellectual offenses more serious than plagiarism in academic and professional contexts. The Purdue Online Writing Lab (OWL) resource offers advice on how to avoid plagiarism in your work. See <https://owl.english.purdue.edu/owl/resource/589/02/>.

The *iThenticate Plagiarism Detection Software* resource <http://www.ithenticate.com/> and SafeAssign function in Blackboard will be used by Professor Mesecar for plagiarism detection of course work. Consequences for plagiarism can include a grade of F for the course and a report to the Dean of Students on academic dishonesty.

## **Emergencies**

*In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.*

## **Active Shooter(s) and Shelter in Place**

Purdue University has issued guidelines for Active Shooters. See the following site; [https://www.purdue.edu/ehrs/emergency\\_preparedness/flipchart/activeshooter.html](https://www.purdue.edu/ehrs/emergency_preparedness/flipchart/activeshooter.html)  
Our BCHM 105 classroom is capable of being locked. Please familiarize yourselves with how to lock the door.

## **Purdue Emergency Notification**

In encourage all of my students to subscribe to our emergency notification service. Please go to the following website and subscribe.

[http://www.purdue.edu/newsroom/health\\_safety/mail.html](http://www.purdue.edu/newsroom/health_safety/mail.html)

I do allow my students to keep their cell phones on vibrate during class so they can get these messages.

## Academic Calendar - Spring Semester 2020

<https://www.purdue.edu/registrar/calendars/2019-20-Academic-Calendar.html>

### **January**

Monday	13	CLASSES BEGIN
Monday	20	Martin Luther King Jr. Day (No Classes)
Tuesday	21	Last day (by 5 pm) for registration without a late fee
Monday	21	Last day to cancel a course assignment without it appearing on record

### **February**

Monday	10	<b><i>Last day to withdraw a course with a grade of W or to add/modify a course with instructor and advisor signature</i></b>
Monday	24	Last day for grade correction for Fall 2017 semester.

### **March**

Monday	13	<b><i>Last day to Withdraw from a Course with a W or WF grade</i></b>
Monday	13	Last day to Add/Modify a course with Instructor, Advisor and Department Head signature.
Mon.-Sat.	16-21	<b>SPRING VACATION</b>

### **May**

Saturday	2	CLASSES END
Monday	4	<b>FINAL EXAMS BEGIN</b>
Saturday	9	<b>FINAL EXAMS END</b>
Saturday	9	SEMESTER ENDS
Saturday	9	Deadline for pending incomplete grades to become failing grades
Tuesday	12	<b>Grades Due</b>
Friday	15	Commencement (1 <sup>st</sup> Division) 3 pm Commencement (2 <sup>nd</sup> Division) 7:00 pm
Saturday	16	Commencement (3 <sup>rd</sup> Division) 9:30 am Commencement (4 <sup>th</sup> Division) 2:00 pm
Sunday	17	Commencement (5 <sup>th</sup> Division) 9:30 am Commencement (6 <sup>th</sup> Division) 2:00 am

## BIOL/BCHM 536 Tentative Class Schedule (Weeks 1 thru 4)

Wk	Lecture	Day	Date	Topic
1	1	Mon	Jan 13	History and Overview of Drug Discovery
	2	Wed	Jan 15	History and Overview of Drug Discovery
	3	Fri	Jan 17	History and Overview of Drug Discovery
2	<b>MLK</b>	<b>Mon</b>	<b>Jan 20</b>	<b>Martin Luther King Jr. Holiday</b>
	4	Wed	Jan 22	Protein Structure – Structure of Water, Amino Acid Side Chain Properties, Bonding Forces
	5	Fri	Jan 24	Protein Structure & Molecular Interactions - Basic Forces and Bonding, pKa's and acid-base chemistry.
3	6	Mon	Jan 27	Protein Structure – Peptide Bonds and Primary Structure, Secondary Structures & Motifs
	7	Wed	Jan 29	TBD
	8	Fri	Jan 31	Protein Structure – Tertiary & Quaternary Structures
4	9	Mon	Feb 3	Forces that stabilize Proteins and Their Interactions with Drug Molecules Introduction to Antibiotics Principles and Biology of Antibiotic Target Selection
	10	Wed	Feb 5	Introduction to Antibiotics - Penicillins
	11	Fri	Feb 7	Antibiotics – Penicillins Beta-Lactamase mechanism and Inhibitors

## BIOL/BCHM 536 Tentative Class Schedule (Weeks 5 thru 8)

Wk	Lecture	Day	Date	Topic
5	12	Mon	Feb 10	Enzymes Kinetics – zero and first order reactions Single Substrate Reactions Michaelis-Menten Equation Briggs-Haldane Equation Meaning of Km and Vmax <b>(Last day to withdraw from a course without a grade, to add a course, or change to pass/not-pass option)</b>
	<b>EXAM 1</b>	Wed	Feb 12	<b>Covers Material to Lecture 11</b> In class exam
	13	Fri	Feb 14	Meaning of Vmax/Km and relation to MIC of antibiotics Bi-substrate Reactions (Sequential and Ping-Pong)
6	14	Mon	Feb 17	Inhibitor Interactions with Enzymes Competitive, non-competitive, uncompetitive Meaning of Ki values Meaning of IC50 Values
	15	Wed	Feb 19	Chemical Modification of Enzymes by Covalent Inhibitors
	16	Fri	Feb 21	Antibiotics – Beta Lactamases and their Mechanisms of Inhibition and Resistance
7	17	Mon	Feb 24	Antibiotics – Sulfonamide Drugs and Their Targets
	18	Wed	Feb 26	Antibiotics – Susceptibility Testing and Trimethoprim
	19	Fri	Feb 28	Antibiotics – Targeting the Ribosome <b>Desired Team Member Traits Survey</b>
8	20	Mon	Mar 2	Antibiotics – Targeting DNA Gyrase
		Wed	Mar 4	Antivirals - The Flu Virus and Neuraminidase Virus Structure, Basic Virology and Virus Lif Cycle
	21	Fri	Mar 6	Antivirals -Neuraminidase Mechanism and Inhibitors Structure Activity Relationships and Drug Resistance



## BIOL/BCHM 536 Tentative Class Schedule (Weeks 9 thru 12)

Wk	Lecture	Day	Date	Topic
9	22	Mon	Mar 9	Antivirals - HIV and Aids Statistics HIV Protease <b>Assign Teams 1 to 5</b>
	23	Wed	Mar 11	Antivirals- HIV Protease Mechanism and Inhibitors Drug Resistance and HIV Protease
	24	Fri	Mar 13	<b>Potential Guest Lecture</b>
10				<b>Spring Break March 16 – March 21</b>
11	25	Mon	Mar 23	Antivirals
	<b>EXAM 2</b>	<b>Wed</b>	<b>Mar 25</b>	<b>Covers Material to Lecture 24</b> <b>In class exam</b>
	26	Fri	Mar 27	Beta-Secretase 1 and 2 (BACE1 and 2) as Targets for Alzheimers and Diabetes – Overview of Biology and Structure of BACE 1 and 2
12	27	Mon	Mar 30	Beta-Secretase 1 and 2 (BACE1 and 2) as Targets for Alzheimers and Diabetes – Structure Based Drug Design and Clinical Trials
	28	Wed	April 1	Anticancer Drugs- Overview of Cancer as a disease and the three stages of carcinogenesis and metastasis
	29	Fri	April 3	Anticancer Drugs

## BIOL/BCHM 536 Tentative Class Schedule (Weeks 12 thru 16)

Wk		Day	Date	Topic
13	30	Mon	April 6	Anticancer Drugs
	31	Wed	April 8	Anticancer Drugs
	32	Fri	April 10	Anticancer Drugs
14	33	Mon	April 13	Anti-inflammatory Drugs-Rheumatoid Arthritis
	34	Wed	April 15	Anti-inflammatory Drugs- Rheumatoid Arthritis
	35	Fri	April 17	Anti-inflammatory Drugs-Rheumatoid Arthritis
15	36	Mon	April 20	Anti-inflammatory Drugs-Rheumatoid Arthritis
	<b>EXAM 3</b>	Wed	April 22	<b>Covers Material to Lecture 36</b>
		Fri	April 24	Student Team Presentations A & B <b>*Team PowerPoint Presentations Due (Jump Drives for ALL groups due by 9:00 am to Prof. Mesecar)</b>
16		Mon	April 27	Student Team Presentations C & D <b>*Team Project Written Reports Due (by 5 pm to Professor Mesecar)</b>
		Wed	April 29	Student Team Presentations E & F <b>*Team Member Evaluations Due (by Noon to Professor Mesecar)</b>
		Fri	May 1	Student Team Presentations Results and Final Discussion
17		Mon Sat	May 4- May 9	<b>Final Exam Week</b>
18		Fri- Sun	May 15- 17	<b>Commencements</b>

This syllabus is subject to change at any time. Should changes be made, all students will be contacted in-class and/or through the course website.