

**FACULTY DEVELOPMENT PLAN
CHEMISTRY AND BIOCHEMISTRY [PROFESSORIAL]
OUTLINE**

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FACULTY DEVELOPMENT PLAN (PROFESSORIAL)

Name Department of Chemistry and Biochemistry

I. SELF-ASSESSMENT

a. Current Strengths in Teaching, Researching, and Citizenship

One of the main reasons that I wanted to join the faculty at BYU was because of its connection to the gospel. The gospel is an intragyrical part of who I am as a person. I am so thankful for the opportunity to interact with brothers and sisters in the gospel on a daily basis. There are very few places that I would be able to share my love of the gospel and love of science with my students. As a woman in the STEM field and as an LDS woman who has raised a family with a supporting spouse, I feel it is my responsibility to further the mission of BYU by helping students to grow in the gospel as well as science.

Teaching:

My strengths in teaching come from experience as an instructor for high school chemistry and math for a charter school prior to going to graduate school. There I had the opportunity to develop new curriculum and determine the type of teacher I wanted to be. Through these experiences I have grown to truly appreciate the process of explaining difficult concepts to students. My favorite part about teaching is watching a student's face as they have those moments of enlightenment and you can see that you just expanded their world and understanding. My first semester I taught Chem. 285.

Research:

My most developed strength lies in the area of research. As a graduate student, I studied protein therapies in the field of muscular dystrophy in Dr. Dean Burkin's Lab at the University of Nevada-Reno, and as a postdoctoral fellow I received funding to continue my work in Dr. Burkin's lab. In January 2018 the work I was doing resulted in the issuing of a patent for the use of Galectin-1 as a protein therapy in muscular dystrophy. Dr. Burkin's lab is finishing the work I started in the development of this therapeutic and are in the process of submitting an article from that work. Over the last year I have obtained the equipment needed to expand the work I was doing to include another form of muscular dystrophy. We have produced a recombinant protein which we are using on mouse and human muscle cell lines to determine its efficacy in this disease. I have one graduate student and three undergraduate students working on this project. Two of the undergraduates have Undergraduate research awards and one of them is taking Chem. 297R for credit. My interactions with these students involve daily mentoring and guiding of research projects, as well as teaching laboratory techniques. I have thoroughly enjoyed working with these students.

In addition to studying muscular dystrophy, I am studying Idiopathic Pulmonary Fibrosis (IPF). One of the main reasons I went graduate school was because I wanted to study IPF. I feel strongly that the Lord wants me to study this disease. I have a collaborator at the University of Washington who is the Director of the Center for Interstitial Lung Disease with UW medicine. I was able to meet with him in the fall of 2017 to discuss our collaboration and ideas for writing a grant. Through his mentoring I believe that I will be able to produce data which will lead to a

grant. I have two undergraduates with undergraduate research awards working on this project and in the fall there will be two graduate students working on this project.

Citizenship:

My current citizenship involves serving on the Student Advisement Committee. I am assigned to incoming freshmen and have enjoyed meeting with these enthusiastic students. I was also able to speak at UVU and BYU-I on behalf of the recruiting committee.

b. Areas for Development in Teaching, Research, and Citizenship

Teaching:

As a new professor at BYU, I understand there are many areas for improvement, particularly in the area of teaching. I have the opportunity to teach Chem. 285 again in the Fall 2018 and Spring 2019. I did not do as well as I had hoped Fall 2017. I was able to sit in on a couple of Dr. Steve Wood's Chem. 481 classes which was helpful. I used SCOTT at midterm to determine changes students would like or what they liked and didn't like. I also had the CTL assess my student comments. Afterward I met with Steve Wood and Rebecca Samson to help me evaluate changes I could make to improve my teaching. These are the aspects of teaching I would like to focus on for improvement:

1. Understand the material better.
2. Organize the class material with student learning in mind.
3. Develop strategies to encourage more interaction and engagement in class
4. Develop creative and dynamic ways to introduce new topics and generate student interest
5. Continue to hone Chemistry 285 curriculum in order to 1) prepare students better for nursing program/dietetics program and 2) work with Dr. Wood to develop an on-line supplement that follows our organization of the course with text videos and assessment problems.

Research:

In order to maintain a productive biochemistry research program that will benefit the mission of BYU, I need to achieve external funding. This will require promising preliminary data and excellent grant writing skills. In today's funding climate, it is typically necessary to submit many grant proposals in order to achieve success. It will also be critical to choose exciting avenues of research and promote my research/form collaborations by interacting with the larger scientific community. My overall goals for producing these grants are as follows:

1. Develop consistent writing habits; keep to a schedule of writing daily.
2. Obtain government and private funding to support graduate and undergraduate research.
3. Publish in top tier peer-reviewed journals on a yearly basis.
4. Guide my laboratory into exciting, productive, and fundable research areas.

5. Provide opportunities for undergraduate researchers to become coauthors on high impact journals.
6. Seek collaborations both inside and outside of BYU.
7. Present my research at prominent meetings and other universities.

I have specific goals in the areas I am researching. The areas of research I choose to focus on and the associated goals in those areas are as follows:

1. Muscular Dystrophy
 - I. I have submitted a letter of intent to the Jain Foundation to submit a grant but was denied because a lack of preliminary data. My goal is to produce the data that is need to apply for this grant this summer (2018).
 - II. I will also use this data to apply for an MDA grant and a NIH RO1 or R15 grant.
2. Pulmonary Fibrosis
 - I. I have written a specific aims page and sent it to JC Price and Dr. Raghu. I am deciding what grant to apply for. I would like to submit at least one grant this summer and be prepared to submit a grant to the IPF foundation for their August 30 deadline.
 - II. I plan on contacting Dr. Hope who works on making mouse models. I think she would be a good collaborator in making a new mouse model for IPF.
 - III. I am going to write a second specific aims page that will investigate familial IPF. It will incorporate gene sequencing, genealogical research with human subjects.

Citizenship:

My citizenship will be developed by learning to serve effectively and efficiently on committees. My goal is to voice my opinion more and learn more about the degree requirements. Since I am over the incoming freshmen I would like to make an effort to know who they are. I plan to do this by getting a list from Sue and reaching out to them through email.

II. TEACHING GOALS

a. Teaching Philosophy

My classroom efforts should be completely focused on helping students to grow intellectually and spiritually. As part of this effort, I hope to instill in students a love of Biochemistry and the molecular mechanisms of life. In addition, students should leave my class with a greater appreciation for the spiritual nature of life and Heavenly Father's plan.

b. Teaching goals

1. Understand the material better.
 - I. Regularly sit in on the class of more experienced professors to learn their teaching approach. Winter 2018 I sat in on Dr. Todd Bronson and Dr. Paul Stark's Chem. 285 class and Dr. Steve Graves Chem. 481 class. This helped me to see

- different teaching styles. I would like to sit in on a whole semester of Chem. 481 before I teach it Fall of 2019.
- II. Learn to use on-line tools (learning suite and others) more effectively in order to the make class more interesting
 - III. Meet with book publisher to learn how to use their on-line learning tools.
2. Organize the class material with individual student learning in mind.
 - I. I would like all of my class content to reflect “What I would like them to do or become”.
 - II. I hope to align what I would like students to be able to do at the end of my course with in class work, homework and assessments.
 - III. Design homework/take-home quizzes that will prepare students better (prior to class) so that we can have higher level discussions of the subject matter in class.
 - IV. I am going to focus more on administering to the “one”, to see each of my students each as one of Heavenly Father’s children. This is essential so that I might be able to hear and act on spiritual promptings
 3. Develop strategies to encourage more interaction and engagement in class
 - I. Ask appropriate questions and develop modules for group work during class
 - II. About half way through the semester I started using worksheet with my lectures. And chapter summaries According the midterm SCOTT assessment the students really liked this method of teaching.
 - III. Continue to share gospel stories or insights as I feel prompted to do so.
 4. Develop creative and dynamic ways to introduce new topics and generate student interest
 - I. Learn to use on-line tools (learning suite and others) more effectively in order to the make class more interesting.
 - II. Be excited about biochemistry and how it relates to life and faith
 5. Continue to hone Chemistry 285 curriculum in order to 1) prepare students better for nursing program/dietetics program and 2) work with Dr. Wood to develop an on-line supplement that follows our organization of the course with text videos and assessment problems.
 - I. Meet with instructors of Chemistry 481 and discuss ways to improve the relationship between the classes’ subject matter.
 - II. Continually work to incorporate (or subtract) topics in order to stay aligned with the cutting edge of the field

c. Relationship of teaching goals to university aims

The goals I have set for myself are designed with the university aims in mind: “A BYU education should be (1) spiritually strengthening, (2) intellectually enlarging, and (3) character building, leading to (4) lifelong learning and service.” In my opinion, the goals listed above are aligned with the greater mission of the university.

d. Resources needed to accomplish teaching goals

- Mentoring is critical. My senior faculty mentor is Dr. Steve Wood, who has provided excellent guidance so far. Additionally, mentoring from another senior faculty will be important
- Sufficient time to allow for class preparation and interaction with students outside of class

III. RESEARCH GOALS

a. My research philosophy

We are endowed with a desire to understand our world. Research allows for us to freely explore the mysteries of this world, which can be tremendously fulfilling and contribute positively to society. In my laboratory, I believe that an open and collaborative environment in which cutting edge questions are addressed offers the best chance for research success.

b. Research goals

1. Develop consistent writing habits; keep to a schedule of writing daily.
 - I. I have joined a writing group lead by Kara Sowers. We meet once a week to discuss and read each other's writing. We report weekly how much we have written.
 - II. I also am part of a Skeletal muscle writing group that meets every quarter.
2. Obtain government and private funding to support graduate and undergraduate research.
 - I. I have meet with JC Price, Josh Andersen and Rebecca Samson about possible Grants that I should apply for.
 - II. I plan to apply for funding from the following sources:
 - i. NIH National Heart, Lung, and Blood Institute (NHLBI)
 - ii. NIH National Human Genome Research Institute (NHGRI)
 - iii. NIH National Institute of Aging (NIA)
 - iv. NIH National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)
 - v. NIH National Institute of Neurological Disorders and Stroke (NINDS)
 - vi. Muscular Dystrophy Association (MDA)
 - vii. Jain Foundation
 - viii. American Federation for Aging Research
 - ix. Pulmonary Fibrosis Foundation
3. Publish in top tier peer-reviewed journals on a yearly basis. The following list is a short sample of the journals for which our laboratory will aim:

- I. PNAS
 - II. Nature Cell Biology
 - III. Journal of Biological Chemistry
 - IV. EMBO Journal
 - V. Molecular Cell
 - VI. Molecular and Cellular Biology
4. Guide my laboratory into exciting, productive, and fundable research areas
 - I. Stay abreast of the current topics in my discipline by reading the literature and attending meetings
 - II. Effectively manage and guide the researchers in my laboratory. I have set up two research teams for the two areas of research that I am pursuing. I will hold bi-weekly lab meetings with everyone. On the off weeks, I plan to hold small group meetings with the individual research teams in my lab.
 - III. Monitor funding sources and research funding announcements weekly.
 5. Provide opportunities for undergraduate researchers to become coauthors on high-level publications
 - I. Maintain a productive team of graduate students and undergraduates to allow for undergraduates to make meaningful research contributions.
 - II. My Undergraduates are applying for URA's and I currently have 4 students with URA's. I plan to increase this number to 8 eventually. (2 per graduate student) I am going to have at least one of these current students apply for an ORCA grant and am encouraging my graduate student to apply for an F31 grant.
 6. Seek collaborations both inside and outside of BYU.
 - I. I have spoken with JC Price about writing a grant for IPF.
 - II. I am working with Dr. Raghu from University of Washington.
 - III. I will present at an MMBIO seminar in order to learn more about research that is being conducted on campus.
 7. Present my research at prominent meetings and other universities. I will aim to attend at least one national meetings each year.

c. Relationship of research goals to university aims

I believe that in order to provide a state-of-the-art scientific education to undergraduates at BYU, we should stay at the top of our fields. We can accomplish this by being active scholars and contribute, through top-notch research, to the scientific community. This endeavor will require consistent funding and publishing, as stated in my goals.

d. Resources needed to accomplish research goals.

Time to pursue scholarship and the monetary resources in my start-up package.

IV. CITIZENSHIP GOALS

a. Citizenship philosophy

I am committed to the idea that all of us have a responsibility to contribute, through serving on committees and working behind the scenes, in order to improve the BYU community. I understand that this will require time away from research and teaching.

b. Citizenship goals

1. Reach out to incoming Freshman and existing freshmen through email. I would like to implement the idea of administering to the “one” in our advisement committee. I would like the students that I have stewardship over to feel that the Chemistry department is their home away from home.
2. Make sure that the faculty over sophomores are aware of any issue with the students that are moving up.
3. Attend faculty meetings and contribute creative ideas to improve the workings of the department and university.
4. Keep the mission of the university in mind and let it permeate my contributions to the BYU community.

c. Relationship of citizenship goals to university aims

The BYU mission statement reads: “all instruction, programs, and services at BYU, including a wide variety of extracurricular experiences, should make their own contribution toward the balanced development of the total person. Such a broadly prepared individual will not only be capable of meeting personal challenge and change but will also bring strength to others in the tasks of home and family life, social relationships, civic duty, and service to mankind.” I believe that my goals will help me stay aligned with this mission.

d. Resources needed to achieve my goals

I feel that the essential resource for citizenship contributions is *time*. It will be important for me to allow for time away from teaching and research in order to achieve these goals

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COURSE DEVELOPMENT PROJECT

In the teaching goals section of my Faculty Development Plan, I have identified numerous short- and long-term goals for fulfilling my responsibilities as a Professorial candidate. This year I will do the following to move me closer to achieving my goals.

With the \$300 grant course development project I will develop guided student learning worksheets. This project will be developed with the aid of Ken Plummer with the Center of Teaching and Learning (CTL). I will hire a student that has successfully completed Chemistry 285 to aid me in the development of worksheets that correlate to the 17 learning units in my course. The first time I taught Chemistry 285, one of the complaints for the course was that it was not well organized. After assessing my class through a SCOTT poll, I learned that the students enjoyed in class worksheet through guided learning. I would like to develop these worksheets to align with learning objectives. I have divided the class material in to 17 Units. I would like to develop 17 worksheets to be used in class as individuals and to incorporated group work. I will be teaching Chemistry 285 for the second time Fall 2018 and Spring 2019. I plan to have these worksheets finalized by mid-August 2018.

SCHOLARSHIP STRATEGIES PROJECT

1. The areas of research I choose to focus on and the associated goals in those areas are as follows:

1. Muscular Dystrophy

- I. I have submitted a letter of intent to the Jain Foundation to submit a grant but was denied because a lack of preliminary data. My goal is to produce the data that is need to apply for this grant this summer (2018) and submit a full application by February 2019. Date: _____
- II. I will also use this data to apply for an MDA grant and a NIH RO1 or R15 grant by February 2019. Date: _____

2. Pulmonary Fibrosis

- I. I have written a specific aims page and sent it to JC Price and Dr. Raghu. I will be writing an R15 grant by February 2019. I would like to submit a letter of intent to the IPF foundation for their August 30 deadline. Date: _____
- II. I plan on contacting Dr. Hope who works on making mouse models. I think she would be a good collaborator in making a new mouse model for IPF. Date: _____
- III. I am going to write a second specific aims page that will investigate familial IPF. It will incorporate gene sequencing, genealogical research with human subjects. Date: _____

2. & 3. Specific Scholarly goals and strategies

- A. Develop consistent writing habits; keep to a schedule of writing daily.
 - I. Meet once a week with my writing group to discuss, read each other's writing, report weekly how much we have written.
 - II. Meet every quarter with Skeletal muscle writing group.
- B. Obtain government and private funding to support graduate and undergraduate research. I plan to apply for funding from at least 2 outside sources and 1 for internal funding (see above for date.)
- C. Publish in top tier peer-reviewed journals on a yearly basis. Writing at least one journal article by February 2019. Date: _____
- D. Guide my laboratory into exciting, productive, and fundable research areas
 - I. Read at minimum of 2 articles each week.
 - II. Hold weekly lab meetings.
 - III. Monitor funding sources and research funding announcements weekly.
- E. Provide opportunities for undergraduate researchers to become coauthors on high-level publications
 - I. Maintain a productive team: Increase lab size to 4 graduate students and 8 undergraduate students by February 2019. Date: _____

- II. All undergraduates with URA's and funding for at least 1 of my graduate students.
Date: _____
 - F. Seek collaborations both inside and outside of BYU.
 - I. Write grant with JC Price for IPF. Date: _____
 - II. Write grant with Dr. Raghu from University of Washington.
Date: _____
 - III. Share my research interest through research talks and seminars to find collaborations (3-4 times). Date: _____. Date: _____.
Date: _____. Date: _____.
 - G. Present my research at prominent meetings and other universities.
4. Strategies for measuring successful completion of goals:
- A. I will post me goals and evaluate where I am each month.
 - B. I will date each goal as they are completed.
 - C. I will email my mentor about my progress toward my goals.
 - D. I will review my goals in my annual stewardship review with my mentor.

CITIZINSHIP PROJECT

In the scholarship, teaching and citizenship sections of my Faculty Development Plan I have identified numerous opportunities to foster the habit of regularly reaching out to develop and nurture collegial associations and collaborations.

1. As a part of scholarship, I plan to write grants with BYU faculty members and with a collaborator at the University of Washington. I also will be participating in two writing groups on campus to foster relationships with other faculty members and develop habits of consistent writing. I will give share my research with the BYU community and with collogues off campus through talks.
2. As part of my involvement in the Academic advisement committee I have suggest we reach out to incoming Freshman and existing freshmen through a more personalized invitation to visit members of the advisement committee. I would like to implement the idea of administering to the “one” in our advisement committee. I would like the students that I have stewardship over to feel that the Chemistry department is their home away from home.
3. Make sure that the faculty over sophomores are aware of any issue with the students that are moving up.
4. Attend faculty meetings and contribute creative ideas to improve the workings of the department and university.
5. Keep the mission of the university in mind and let it permeate my contributions to the BYU community.

SYLLABUS · Chem 285 · Fall 2018

Instructor Information

Name: Dr. Name Office

Phone: 801-422-1540

Office Location: Email:

Office Hours:

Course Description

Welcome to Chemistry 285! This is a one semester 4 credit bio-organic-chemistry course for most non-chemistry majors. Biochemistry is the study of biomolecules, their structure, function and properties. This semester we will learn the names, properties, and reactions of organic functional groups and biomolecules. The topics in this course will lay the foundation for study in many other science-related fields including the biological sciences, medical and health sciences, geology and earth science, and engineering.

Prerequisites

(1) Chemistry 101 or equivalent. Most students who struggle with Chem 285 report that a lack of chemistry background caused or contributed to their problems. I suggest you have this prerequisite not only completed but current in your skill-set.

(2) A strong desire to learn. This is a fast-paced, demanding course. To succeed, you will have to dedicate yourself seriously to your studies EVERYDAY. (Yes, you will need to study daily.)

Course Purpose

After Chemistry 285 you will be able to apply biochemical concepts to interpret real-world situations and explain the importance of these concepts and interactions in an inspired way to experts and patients to building the Kingdom of God.

Learning Objectives

Through this course, you will

1. Gain foundational knowledge: Be able to use the basic vocabulary and concepts of biochemistry such as:
 - Understand the structure and reactivity of organic functional groups, such as alcohols, aldehydes, carboxylic acids, and amides.
 - Understand the structure and reactivity of the biomolecules that have those functional groups.
2. Apply foundational knowledge to biochemical systems
 - Understand the metabolism of carbohydrate, lipids and proteins.
 - Be able to describe in structures and words the metabolism of sugars through the pathways of glycolysis, the citric acid cycle, and the electron transport chain.
3. Integrate knowledge gained in class with other areas of life

- Use your biochemistry experience, knowledge, and skills to better understand the world around you and aid you in your own field of study.
4. Learn how to learn
- Learn how scientists seek truth, construct knowledge, and solve problems, and do so yourself.

Required Materials

1. Textbook: Chemistry: General, Organic, and Biological Chemistry: Structures of Life, 5 editions by Timberlake. This is the required text for both Chem 285. You will not be required to bring the textbook to class. The ISBN for the package deal which includes the Book and the MasteringChemistry code is 9781269835015. There are also ISBN for each individually.
2. Access to the online homework system (MasteringChemistry). To enroll in MasteringChemistry, you will need the enrollment key for our class (MCVANRY50983), a valid email address, and a Registration Code. The registration code comes with new copies of the textbook, or you may purchase a code online at www.person.com/mastering/chemistry. Once you have a registration code, follow the instructions given on Learning Suite in the document: "Get Started with Pearson's Mastering Chemistry". To complete these and the other online assignments in this course, you will need daily access to a computer with high-speed internet either at home or through the on-campus computer labs.
3. iClicker transmitter. New or used iClicker transmitters may be purchased from the BYU Bookstore if you do not already have one from another class. Register your transmitter at <http://www.iclicker.com/registration/> entering the following 4 fields: (1) first name, (2) last name, (3) netID (NOT your 9 digit BYU ID number or one you made up) and (4) the number on the back of your iClicker transmitter (note that this number will only contain zeroes, not the capital letter "O").

Learning Activities

"Learning is defined as stabilizing, through repeated use, certain appropriate and desirable synapses in the brain."
– **Robert Leamson**

To provide the repetition necessary to effectively learn chemistry and achieve the learning objectives, I have designed the following learning activities (with more detailed descriptions below):

BEFORE CLASS ACTIVITIES:

1. Reading the textbook (before lectures)
2. Mastering Chemistry online homework exercises (before Lectures completed by Friday)

DURING CLASS ACTIVITIES

3. iClicker quizzes (during the M/W/F lectures)
4. Practice Worksheets (given out at the beginning of each new unit)

AFTER CLASS ACTIVITIES

5. Homework (due each Monday before class.)

BEFORE CLASS ACTIVITIES:

1. **Reading the textbook-** Before each lecture, you will be assigned to read one or more sections from the textbook. My lectures will follow the textbook, so I encourage you to complete these readings before class; if you choose to read the text after class, you may feel lost during lectures.
2. **Mastering Chemistry** online homework exercises- Before each lecture there will be an assigned homework exercise through MasteringChemistry. These are designed to help you learn basic concepts and vocabulary so you can apply them to more difficult problems given in homework sets and exams. I encourage you to do these on a daily basis. They will be due prior to class on Friday. By doing the assignments before class you will have a better grasp of the information before coming to class.

DURING CLASS ACTIVITIES

3. **Practice Worksheets-** At the beginning of each unit you will be given a worksheet with study helps and problems. These are meant to be additional practice to guide you in understanding basic concepts and vocabulary. As we learn more information within a given unit the problem will become more complex. Practice Worksheets will be due the day after the Exam in which the Unit material is covered.
4. **Group Work-** On Wednesdays you will be given a set of roughly 5 challenging/multistep problems to do. These problems will be worked in assigned groups of 5. For the first 25 min of class, each group will start working on a different problem initially. When that problem is finished, you will work through the other 4. During the second 25 min of class, each group will work their problem step-by-step on the board in front of the class (5 min time limit), leading the class in working together to solve the problem. Our TAs and myself will have already worked through the problems and can help the various groups as needed and guide the class discussions. **BE SURE TO COMPLETE ANY UNFINISHED PROBLEMS LATER ON AT HOME.** You will need to understand how to do all the problems to do well on the exam questions, many of which will be based on these very practice sheet problems. A detailed key to each Practice Sheet will be posted on Learning Suite at midnight the day after the Unit is completed.
5. **iClicker quizzes-** During each T/TH lecture, there will be roughly 3-6 short quizzes dispersed throughout the lecture. You will be expected to answer these quizzes through the iClicker electronic response system using your own iClicker (electronic transmitter) that has been registered to your name & BYU netID. These quizzes are intended to be primarily formative, helping you firm basic concepts/vocabulary in your mind and giving me immediate feedback on how well you understand the concepts we are covering so I can spend more time on those concepts that are less understood. Half of the points are awarded simply for participating, the other

half for the correct answer. These quizzes also encourage your punctual and regular attendance.

AFTER CLASS ACTIVITIES

6. **Homework-** Yes! More Practice!! The written homework problems will either be ones from the book or ones on a worksheet. The written homework is to intended to give you practice for the exam. They will be similar to the type of questions you will encounter on the exams. They are due every Monday. I suggest you work on these after class to reinforce the concepts that you have learned and practiced. The answers to these homework problems will be posted on line.
7. **Extra Credit-** The only extra credit available is to do the even problem in the book. If you have a borderline grade you will be give the next grade up (ie. B+ to A-, C+ to B-). This will be an option for all the exams. However, you will have to take advantage of this within the week you get your Exam score. For the Final you will have to hand in all the even problem for all the chapters that were covered. Many students have found it helpful to do the problem in the book. I suggest doing the problems and keeping them in a notebook.

Exams

Four full-length exams will be administered during the semester. Each exam will be comprehensive, meaning they can draw on any material discussed in class up to that point. Problems on the exams will be a combination of multiple choice, true/false, and open response. Exams will test not only your understanding of the concepts, but also your ability to solve problems that aren't exactly like ones you have already seen and your ability to use your biochemistry knowledge to understand and explain the world around you. Each exam will be administered in the Testing Center over a 2-3 day period. The exams will have no time limit, but they should take less than 2 hours if you are well prepared. Look carefully at the course calendar and Testing Center hours and plan ahead so that you do not miss any exams; there will be no make-up exams. If there is a serious and unavoidable reason beyond your control that will prevent you from taking an exam during the scheduled time (e.g., serious illness or death), see me, Dr. Van Ry, before the exam. If an emergency arises during the exam period, both send me an email and call my office phone (the number is on page 1 of this Syllabus)—if I'm not there, leave a phone message.

Final Exams

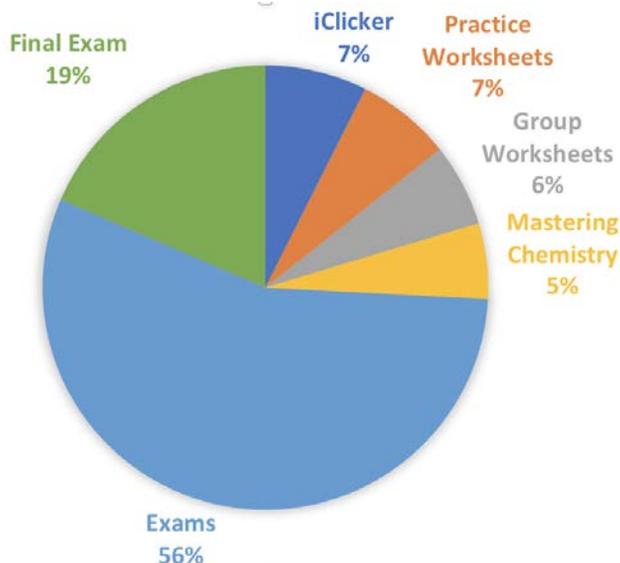
The final exam for the course will be comprehensive and is designed to take approximately 3 hours, though there will be no time limit. The exam will be administered through the Testing Center and must be taken during finals week—no exceptions. (Please do not ask if you can take the exam early because your parents bought you a ticket to Paris to see your brother-in-law's sister's great aunts wedding.) If you do not take the final, you will receive an "E" in the class.

Assessment (Grading Policies)

Your grade percentage will be based on the following weights:

iClicker Quizzes, 80 pts. 20% drop.....	7.4%
Practice Worksheets 75 pts. 15 highest of 17.....	6.9%
Group Worksheets 65 pts. 13 highest of 15.....	6.0%
MasteringChemistry 60 pts. 20% drop	5.5%
Exams (4) 150 pts. each.....	55.6%
Final Exam 200 pts.....	18.5%

Total Possible.....	100%



Your grade percentage will be used to determine your letter grade in the course based on a scale that will be adjusted throughout the semester according to the performance of the class. A normal grading scale (94 A, 90 A-, 87 B+, 84 B, etc.) will be the starting point for the calculating grades but could change (only in a direction that would help) depending on the exam averages.

Assignment-Specific Grading Policies:

1. **iClicker Quizzes**– The iClicker assessments given on Tuesdays and Thursdays during lecture are low-stakes (formative). The goal is to see if you can apply the concept being discussed in class. You will click in your answer, but then are free to talk to your neighbor before the quiz closes (teach each other!) You can miss up to 20% of the points and still receive full credit. Last year there were 136 points minus the 20%, so 108.8 was considered 100%. Once you reach this number you are at 100%. If you earned 100 points, meaning you missed 36 points you would have a 92% for iClicker. You must attend class and complete the quizzes using your transmitter to receive these points; there is no other way. Each iClicker question will be worth 2 points; 1 point will be awarded for answering the question (i.e. for being present at and participating in class), and 1 point will be awarded for selecting the correct answer. One of the iClicker questions each day might be to answer whether or not you completed the Before Class reading and/or online tutorial assignments...
2. **Practice Worksheets**– Each practice sheet will be worth 5 points: 2 points for attending during lecture when it is worked (usually Mondays and Fridays, but sometimes we will work on them on other days), 2 point for completing all the problems, 1 point for getting the correct answer on the random question that will be graded after they are handed in.
3. **Group Worksheets**- Each group worksheet will be worth 4 points: 1 point for attending, 1 point for participating with your group to solve the problems, 1 point for

participating in working/explaining your group's assigned problem at the board with the rest of your group, and 1 point for the board work being correct. You will grade your group members for all points except for the correct answer on the problem you worked. Your TA will assign this point. There will be one practice sheet score per week (27 total). Your highest 15 scores will count toward your grade. You must be present at and working during the recitation to receive points – there is no other way.

4. **MasteringChemistry-** assignments – You can miss up to 20% of the points and still receive full credit. The points will be scaled to 60 points.
5. **Exams–** Each midterm exam will be worth 13.8% of your grade for a total of 55.5% for the 4 midterm exams. The final exam will be worth 20% of your grade. **All exams are comprehensive**, meaning they can cover any material discussed in class up to that point.

Drop Policy- In a class as large as ours, I have had to be creative in addressing the many types of problems students may have in submitting assignments on time. I have thus provided a generous “drop” policy to take care of such problems; as shown above, 20% of your iClicker quizzes will be dropped, 20% of your MasteringChemistry will be dropped, 2 lowest Practice Worksheet scores, and 2 lowest Group Worksheet scores will be dropped. This includes assignments that were missed for any reason including technical difficulties, sickness, or travel (including BYU-approved travel). There will be no make-up assignments, so you should not waste “drops” for frivolous reasons—drops are your only recourse in case of a real emergency. You may keep track of legitimate problems beyond your control which have prevented you from completing or submitting assignments on time, and if such problems have impacted more than the allotted drops, then you may contact me to discuss an appropriate remedy. But wait to approach me until you have used up your drops.

Checking your Scores- Your scores will be posted regularly on Learning Suite. It is important that you check your scores periodically for accuracy and so you are more aware of how you are doing. Report any problems to your TA. All problems with recording of scores must be resolved by the last day of lecture.

Suggestions of Study Habits

For some of you, this is your first year at university, some of you are returning from missions and others are seasoned veterans. WELCOME! You have embarked on a new and radically different educational experience than you have had previously. “Higher” education means that the learning expectations go beyond knowledge and comprehension, which are basic; here you are expected to perform more sophisticated cognitive processes including critical analysis, synthesis, and integrative thinking. You will be expected to learn outside class and prepare yourself to face problems on exams which are not identical to those you have seen before. In a university setting, the responsibility for your learning rests largely on your shoulders rather than on the instructor's; you are expected to take full personal responsibility for your own progress in the class. Here is a rule of thumb for the amount of time you'll need to spend per class suggested,

“Study two hours per credit hour for a lighter class, three hours per credit hour for an average class, and four hours per credit hour for a difficult class.”

-BYU Counseling Center

For most of you, this will be a difficult class and will thus likely require 3-4 hours of study per credit hour, or 12-16 hours/week of work outside of class to do well. I have designed the course learning activities to take roughly this amount of time. For some it may take less, for others it might take more. But more important than the quantity of time spent is the quality of time spent; if you understand a concept, review it briefly for repetition then move on to the problems and concepts you don't understand and spend more time and repetition with those. We all like doing things we are good at, but you don't grow until you push yourself to do or learn new things that you may not be as good at yet. It will require self-discipline to keep up with your assignments and meet posted deadlines. I strongly encourage you to use some kind of personal planner, either paper or electronic, to help you remember deadlines—I will not always remind you when the deadlines posted in the class calendar are coming. In a sense, part of your grade reflects your ability to act in a responsible manner to perform work on time. Exercising discipline in this way will help you develop a level of professionalism that will serve you well throughout your life. You can do this!

Student Resources

This is a large class, and it is easy to get lost. We provide a variety of resources to ensure that you don't, and that you can get help when you need it. Here are some places that you can go for help.

Dr. Van Ry– My office hours are listed at the beginning of this syllabus, and I encourage you to come and see me during those hours. I will be happy to help you with any problems you have in understanding the course material. If you can't make my office hours, feel free to email me to make an appointment. Do not hesitate to come and see me—I enjoy visiting with my students.

TA's– Your TA is a student who has excelled in chemistry and biochemistry courses. Our TAs will be in class, and in addition he/she will also hold office hours that will be posted on Learning Suite. Tutorial Lab – The Chemistry Department provides a free tutoring lab in W155 BNSN for all biochemistry students. All of the TAs for Chemistry 285 hold office hours in that tutorial lab. If you are unable to meet with your TA when he/she is there, you can go to the lab and get help from another TA. The lab is usually open during the regular school day—lab hours are posted on the door and on Learning Suite.

Learning Suite– On Learning Suite you will be able to find copies of course documents including the syllabus, calendar, problem keys, etc. You can also go to the site to check your scores. You can only access this site if you are officially registered in the class. The materials on this site are copyrighted and it is illegal to copy them to other sites or use them in any way outside the scope of your role as a student in this class.

Fellow students– I encourage you to work together with classmates in discussing class material, doing practice problems and preparing for exams. You help yourself understand the

material better by helping another student understand it. Just be sure that you don't fall into the trap of riding someone else's coat tails. Ultimately, you are responsible for understanding the material, and you will be on your own when you take the exams. It would be a serious violation of the honor code to work together on microexams or communicate about the content of exams while they are still available in the Testing Center.

Accessibility Center— If you find yourself struggling in the class or in need of special help, visit the Accessibility Center 2170 WSC. There you will find counselors who can help you— don't put off doing this until it is too late!

University Policies

Honor Code

In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact be your own work and not that of another. Violations of this principle may result in a failing grade in the course and additional disciplinary action by the university. Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and every instructor's expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-2847 if you have questions about those standards.

Student Disability

Brigham Young University is committed to providing a working and learning atmosphere that reasonably accommodates qualified persons with disabilities. If you have any disability which may impair your ability to complete this course successfully, please contact the University Accessibility Center (UAC), 2170 WSC or 422-2767. Reasonable academic accommodations are reviewed for all students who have qualified, documented disabilities. The UAC can also assess students for learning, attention, and emotional concerns. Services are coordinated with the student and instructor by the UAC. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures by contacting the Equal Employment Office at 422-5895, D-285 ASB.

Academic Honesty

The first injunction of the Honor Code is the call to "be honest." Students come to the university not only to improve their minds, gain knowledge, and develop skills that will assist them in their life's work, but also to build character. "President David O. McKay taught that character is the highest aim of education" (The Aims of a BYU Education, p.6). It is the purpose of the BYU Academic Honesty Policy to assist in fulfilling that aim. BYU students should seek to be totally honest in their dealings with others. They should complete their own work and be evaluated based upon that work. They should avoid academic dishonesty and misconduct in all its forms, including but not limited to plagiarism, fabrication or falsification, cheating, and other academic misconduct.

Mental Health Concerns

Mental health concerns and stressful life events can affect students' academic performance and quality of life. BYU Counseling and Psychological Services (CAPS, 1500 WSC, 801-422-3035, caps.byu.edu) provides individual, couples, and group counseling, as well as stress management services. These services are confidential and are provided by the university at no cost for full-time students. For general information please visit <https://caps.byu.edu>; for more immediate concerns please visit <http://help.byu.edu>.

Inappropriate Use Of Course Materials

All course materials (e.g., outlines, handouts, syllabi, exams, quizzes, PowerPoint presentations, lectures, audio and video recordings, etc.) are proprietary. Students are prohibited from posting or selling any such course materials without the express written permission of the professor teaching this course. To do so is a violation of the Brigham Young University Honor Code.

Plagiarism

Intentional plagiarism is a form of intellectual theft that violates widely recognized principles of academic integrity as well as the Honor Code. Such plagiarism may subject the student to appropriate disciplinary action administered through the university Honor Code Office, in addition to academic sanctions that may be applied by an instructor. Inadvertent plagiarism, which may not be a violation of the Honor Code, is nevertheless a form of intellectual carelessness that is unacceptable in the academic community. Plagiarism of any kind is completely contrary to the established practices of higher education where all members of the university are expected to acknowledge the original intellectual work of others that is included in their own work. In some cases, plagiarism may also involve violations of copyright law.

Intentional Plagiarism-Intentional plagiarism is the deliberate act of representing the words, ideas, or data of another as one's own without providing proper attribution to the author through quotation, reference, or footnote.

Inadvertent Plagiarism-Inadvertent plagiarism involves the inappropriate, but non-deliberate, use of another's words, ideas, or data without proper attribution. Inadvertent plagiarism usually results from an ignorant failure to follow established rules for documenting sources or from simply not being sufficiently careful in research and writing. Although not a violation of the Honor Code, inadvertent plagiarism is a form of academic misconduct for which an instructor can impose appropriate academic sanctions. Students who are in doubt as to whether they are providing proper attribution have the responsibility to consult with their instructor and obtain guidance. Examples of plagiarism include:

- Direct Plagiarism**-The verbatim copying of an original source without acknowledging the source.
- Paraphrased Plagiarism**-The paraphrasing, without acknowledgement, of ideas from another that the reader might mistake for the author's own.
- Plagiarism Mosaic**-The borrowing of words, ideas, or data from an original source and blending this original material with one's own without acknowledging the source.
- Insufficient Acknowledgement**-The partial or incomplete attribution of words, ideas, or data from an original source.

Plagiarism may occur with respect to unpublished as well as published material. Copying another student's work and submitting it as one's own individual work without proper attribution is a serious form of plagiarism.

Respectful Environment

"Sadly, from time to time, we do hear reports of those who are at best insensitive and at worst insulting in their comments to and about others... We hear derogatory and sometimes even defamatory comments about those with different political, athletic, or ethnic views or experiences. Such behavior is completely out of place at BYU, and I enlist the aid of all to monitor carefully and, if necessary, correct any such that might occur here, however inadvertent or unintentional. "I worry particularly about demeaning comments made about the career or major choices of women or men either directly or about members of the BYU community generally. We must remember that personal agency is a fundamental principle and that none of us has the right or option to criticize the lawful choices of another." President Cecil O. Samuelson, Annual University Conference, August 24, 2010 "Occasionally, we ... hear reports that our female faculty feel disrespected, especially by students, for choosing to work at BYU, even though each one has been approved by the BYU Board of Trustees. Brothers and sisters, these things ought not to be. Not here. Not at a university that shares a constitution with the School of the Prophets." Vice President John S. Tanner, Annual University Conference, August 24, 2010

Respectful Environment

I have tried to use an integrated approach to designing this course. This means I have thought simultaneously about what I want you to take away from this course long-term (learning objectives), what assessments might be used to measure whether you've met these learning objectives, and what learning activities will help you get there. I then planned and revised the course schedule iteratively until I felt that all three were aligned. In addition, I tried to incorporate a variety of learning activities in order to accommodate the variety of learning styles each of us finds most effective. Here I explain how the course I have planned achieves these ends.

The first objective in this class is to build foundational knowledge. All of you have a beginning chemistry course and know the vocabulary that is taught in those courses. (If you don't remember, I advise you review them.) Biochemistry builds on this foundation by adding new vocabulary and concepts learned in Chemistry. I intend for you to gain this foundational knowledge, becoming familiar with the basic terminology and concepts of biochemistry chemistry, primarily through your Before Class reading and online assignments. Lectures will continue to develop your understanding of the basic concepts, but lectures should not be your first or primary exposure to them. Assuming you take notes both during lectures and during the Before Class assignments as I suggest, these activities will incorporate 4 different learning styles so that the needs of those who favor visual images (online assignments & lectures), audible explanations (online assignments & lectures), methodical conceptual outlines (textbook readings), and kinesthetics (writing notes) will all be met.

The second objective is for you to learn how to apply the knowledge you gain. In lectures MWF, we will work example problems and show you how to begin applying biochemistry knowledge. You will then practice applying your knowledge through the online MasteringChemistry assignments, cementing the basic concepts and vocabulary in your mind. Then in the Homework you will apply your knowledge to more difficult problems, further developing your critical thinking and problem-solving skills. Lectures will also incorporate the element of human interaction; even though learning is ultimately an individual experience,

studies have shown (for both extroverts and introverts) that sharing the learning process with others greatly enhances it. After all, I believe you don't truly understand something until you can explain it effectively to another person, and by attempting to verbalize your ideas, you quickly see where your understanding is lacking. Thus, Wednesday lectures will incorporate a social aspect to learning as you strive to meet learning objective #2, applying chemistry knowledge.

The third objective is to integrate your chemistry knowledge with real life – to use the microscopic concepts you learn in the classroom to explain the macroscopic world around you and aid you in your particular field of study. To help you begin making real world connections, it is my goal for every lecture to point out at least one example of how the abstract concepts we are learning are actually manifested in and impact things in the physical world. The abstract concepts in class will further be connected to physical reality in homework problems and before class reading.

The final objective in this class is for you to learn how to learn like a scientist. One of the ways I hope to achieve this is by introducing you to real world application for biochemistry; by sharing these examples and thought processes as well as my own, you will hopefully be able to understand the logical, methodical, and analytical way in which biochemists think and deduce knowledge from the world around them. I will try to model these logical thought processes during class as we solve problems. Then, through your own experience with the various homework assignments and worksheets, I hope you will learn to use this 'scientific method' (or logical way of seeking truth, constructing knowledge, and solving problems) so that you can apply it to problems throughout your life outside of a biochemistry classroom.