

Teaching Portfolio

January 2015

Gregory J Crouch

Signed:



Dated: January 8, 2015

A. Goals

My primary teaching goal is to mindfully link what I know and continue to learn about chemistry to the courses I teach. With these goals kept firmly in mind, my teaching philosophy centers on three broad principles:

- 1) Chemistry is best taught as a liberal art.
- 2) The classroom is a learning community in which expert learners (faculty) guide apprentice learners (students).
- 3) Learning goals must be linked with valid assessments of student learning

My foundation in teaching chemistry as a liberal art is based in part on work by Nobel laureate Dudley Herschbach collected under a series of talks and papers called "The Impossible Takes a Little Longer" (1). In this series on chemical education, Professor Herschbach champions approaching teaching through instilling the "habit of self-generated questioning and thinking, of actively scrutinizing evidence and puzzling out answers." This philosophy is further supported by *Tomorrow*, the American Chemical Society task force report on chemical education in the United States (2). In addition, a wider ranging report from the American Association for the Advancement of Science suggests all science education should follow a liberal arts model (3). The liberal arts model differs from a more career-specific model in that it is based on developing skills in critical thinking, writing, and analysis that are necessary for a successful graduate, especially when flexibility in the job market is required in our current economy.

A learning community model begins with the hypothesis that subject mastery does not occur in a vacuum; instead, knowledge is best acquired within a small group dynamic. Further, this group must have a diversity of members with varying levels of expertise in the subject. In this way, Vygotsky's ideas are expressed in a concept called the "zone of proximal development" where "more capable peers" model successful behavior and help struggling students connect foundational knowledge in such a way as to learn new concepts (4). For example, simple atomic theory is discussed in high school and first-year chemistry courses. In second-year chemistry, these concepts serve as a foundation upon which the bonding model called hybridization is built. Hybridization in chemical bonding is a topic that is traditionally very difficult for second-year students to master, which is in a large part due to their inexperience in building upon existing knowledge (first-year atomic theory) with new knowledge (hybridization). Using a collaborative learning model, a more capable peer can guide a less experienced

student in how to best learn a difficult and abstract concept. The point of the specific example is behavior modeling. The more capable peer had also recently struggled with the abstract notion of hybridization but now understands the concept. The behaviors modeled by a successful peer (regularly attending lecture, attending tutoring well before an exam, reading in advance of lecture, asking questions in lecture) translate beyond merely helping a struggling student understand a difficult concept, helping to lay a deeper foundation for the less experienced student's success.

Specifying learning goals for a course has become standard practice in higher education. However, those goals are not useful unless student achievement of those goals can be measured. In science and math courses the usual major assessment instruments are mid-term and final exams. Typically, these exams count for more than half of a student's overall course grade, with the balance made up in homework assignments and labs. Further, given the large classes typical of first and second year courses, many faculty members rely on multiple choice exams that can be machine graded. The validity of machine graded exams as an instrument to measure a student's achievement of specified learning goals is tenuous in the science education literature, however, they are still widely used as they are often perceived as the only way to deliver an exam to a large numbers of students. My courses rely heavily on summative assessments such as midterms and final exams; however, none of these instruments use multiple choice questions. Rather, I write exam questions to have many reasonable answers so that students can be assessed on broader problem solving skills as opposed to simple factual recall. Examples of these types of questions are presented in Appendix 1. I have reorganized the course so that the TAs and faculty have time to grade these exams manually but also quickly enough to give students timely feedback on their performance. I also try to balance this with formative assessment such as lecture participation and homework. A recent formative assessment tool that we recently implemented is based on the Bring Your Own Device (BYOD) model where students are presented a concept, challenged for understanding, and then the concept is reinforced as necessary. Much of this is done "on-the-fly" and can be customized based on immediate results. Ultimately my goal is to use the assessment tools that will best benefit my students and allow for a more accurate analysis of student learning outcomes.

B. Responsibilities

1. Courses recently and currently taught

My teaching duties have primarily focused on 300-level organic chemistry but from time to time have included teaching graduate level chemistry courses as well. Over the course of my career, I have had the pleasure of working with colleagues who share my goals for improving undergraduate education and that has resulted in many curriculum reform efforts in the department. Unfortunately, these reform efforts have resulted in a number of catalog number changes that make the assignments somewhat difficult to follow. Most significantly, prior to 2005 we taught organic chemistry as a sequential two-semester lecture and two-semester lab course (Chem 340, 341, 342, and 343). In addition we taught a one-semester survey class called Chem 240. Faced with a steady downward movement in grade distribution in these courses, we implemented a curriculum reform based on a spiral

approach. Specifically, we combined our first semester Chem 340 with our survey course Chem 240 and presented both as a survey based on functional groups called Chem 345. This new course was designed with a coordinated three-hour weekly lab and was intended to serve two populations of students, those students for whom Chem 345 would be the terminal chemistry class and those students who would go on to a new second-semester course called Chem 346. It is in this second course that the spiral approach is realized; basic concepts presented in Chem 345 are reviewed and amplified in Chem 346. In addition, our prior work with a collaboration-based learning approach called Peer Lead Team Learning (PLTL) was implemented in an optional one-credit problem solving course called Chem 348. The PLTL approach relied upon peer facilitators (Vygotsky's "more capable peers") to lead problem solving sessions in classrooms that had movable furniture or tables where the group dynamic could best be fostered. Co-enrollment in Chem 348 was optional in the second semester with about 85% of student opting into this program. After five years of grade analysis it became apparent that students enrolled in both second semester organic chemistry (3 credit Chem 346) and the workshop (1 credit Chem 348) had, on average, a full letter grade benefit from those students enrolled in Chem 346 alone. As a result, we decided to merge Chem 346 and Chem 348 into a single 4-credit second-semester course confusingly named Chem 348. In all of these large lecture courses, my goal is to foster student-student and student-faculty dialog and reduce the barriers to lecture engagement. A recent syllabus for Chem 345 is presented in Appendix 2.

Year/Semester	Course #	Course Title	Credits	Enrollment
2014 Fall	345	Organic Chemistry I	4	239
2014 Spring	348	Organic Chemistry II	4	127
	345	Organic Chemistry I	4	229
2013 Fall	345	Organic Chemistry I	4	210
	542	Advanced Organic Chemistry	3	28
2013 Spring	348	Organic Chemistry II	4	155
	345	Organic Chemistry I	4	253
2012 Fall	345	Organic Chemistry I	4	255
2012 Spring	348	Organic Chemistry II	4	135
	345	Organic Chemistry I	4	247
2011 Fall	345	Organic Chemistry I	4	358 ²
2011 Spring	348	Organic Chemistry II	4	132
	345	Organic Chemistry I	4	229
2010 Fall	345	Organic Chemistry I	4	192
2010 Spring	348	Organic Chemistry II	4 ¹	114
2009 Fall	345	Organic Chemistry I	4	179
2009 Spring	346	Organic Chemistry II	3	135
	348	Problem Solving in Organic Chemistry	1	131
2008 Fall	345	Organic Chemistry I	4	178
2008 Spring	346	Organic Chemistry II	3	85
	348	Problem Solving in Organic Chemistry	1	70
2007 Fall	345	Organic Chemistry I	4	161
2007 Spring	345	Organic Chemistry I	4	168
	346	Organic Chemistry II	3	141

	348	Problem Solving in Organic Chemistry	1	122
2006 Fall	345	Organic Chemistry I	4	176
2006 Spring	346	Organic Chemistry II	3	219
	348	Problem Solving in Organic Chemistry	1	186
2005 Fall	342	Organic Chemistry	3	113
2005 Spring	240	Survey of Organic Chemistry	3	117
2004 Fall	340	Organic Chemistry	3	296
	341	Organic Chemistry Lab 1	2	231
2004 Spring	542	Organometallic Chemistry	3	7
2003 Fall	340	Organic Chemistry	3	250
2003 Spring	342	Organic Chemistry	3	153
	344	Problem Solving in Organic Chemistry	1	125
2002 Fall	340		3	228
	344	Problem Solving in Organic Chemistry	1	29
2002 Spring	342	Organic Chemistry	3	122
	343	Organic Chemistry Lab 2	2	24
2001 Fall	340	Organic Chemistry	3	194
	341	Organic Chemistry Lab 1	2	170
2001 Spring	340	Organic Chemistry	3	46
	341	Organic Chemistry Lab 1	2	34
2000 Fall	340	Organic Chemistry	3	156
	341	Organic Chemistry Lab 1	2	147
2000 Spring	240	Survey of Organic Chemistry	4	82
1999 Fall	340	Organic Chemistry	3	186
	341	Organic Chemistry Lab 1	1	155

Prior teaching effort data unavailable

¹ denotes the first time 346 and 348 were combined into a "new" 4 credit 348 course.

²team taught with one other instructor.

In addition to face-to-face teaching as described above, I also mentor new faculty in effective pedagogy. I also conduct program assessment in teaching and learning at WSU Tri-Cities and WSU Vancouver campuses.

2. Work with individual students

In the course of my career I have served on 12 graduate committees; the two that are the most noteworthy were both Individual Interdisciplinary Degree PhD students. In the IIDP path, I mentored Ian Quitadamo (PhD 2002), now a professor of biology and science education at Central Washington University and Jenni Light (PhD 2005), now an associate professor in the pre-engineering program at Lewis-Clark State College. For both of these students, the IIDP program provided a unique opportunity to explore educational research in the sciences and math.

3. Advising.

From 1998 to 2004 I served as an undergraduate advisor in the department. From 2006 to current, I served as a graduate advisor in the Division of Organic Chemistry and the Chemistry of Biological Systems. As an undergrad advisor, I typically met with chemistry majors as well as pre-professional students (pre-med, pre-vet, pre-dent, pre-pharm) and worked with many of them to establish a career "Plan B" in case they were unsuccessful in their applications to professional schools. Many of the students I advised selected a major based on a perception of what would afford them their best chance for entering (medical) school – as opposed to a major that would lead to a fulfilling career on its own. I also worked with the Center for Teaching and Learning and Technology during this time to establish an online advising "portfolio," which interestingly is only now being implemented. I strongly support this effort as a student often has many advisors during his or her time at WSU and it is absolutely essential to have a record of each so as to help prevent delays in degrees.

4. Instructional innovations

In 1999 I was principle investigator on a successful NSF proposal that funded the acquisition of a teaching nuclear magnetic resonance spectrometer. This instrument was remotely shared with local colleges and the project was summarized in a paper in *Benefiel et al.* listed in Section 6 below.

In 1998 we implemented a small group learning model called Peer Led Team Learning in Chem 340 and Chem 342 (5). This model used well trained peer facilitators to lead students through problem solving exercises with great success. Before the implementation of the PLTL program, the FWD rate in Chem 340 was 45% with a gender bias of about 70% women. After implementation of PTLT the FWD rate dropped to 24% with no gender bias. This program ran for 3 years with great success until it became too expensive to continue. However, the PLTL model was integrated within the second semester organic chemistry course Chem 348.

In 2001 & 2002, I was principal investigator for two successful NSF proposals that funded a proof of concept model of a project called Adaptive Teaching and Learning (ATLs) in conjunction with Pacific Northwest National Labs. In summary, we created an online environment where students navigated in stages through an ebook style lesson and were challenged at each stage with questions designed to identify "conceptual bottlenecks." This real time formative assessment data was used to modify in-class lecture to aid in learning gaps. This project is summarized in *Quitadamo et al.* listed in Section 6 below

In 2004 I coordinated a team of faculty in a first year student program called Teniwe. In this program, entering students who had identified a science or engineering major were clustered together in Gannon Goldsworthy dorm as well as in into chemistry, math, and engineering classes. Faculty in these classes worked together to find conceptual overlap within his or her learning goals. Many of the aspects developed in this program are still in use as part of WSU's Freshman Focus. This effort was funded internally by a Provost's Innovation in Teaching and Learning grant.

In 2005, I was part of a team where learning goals for organic were identified and the curriculum adapted to fit into the so-called spiral approach (6). Students who enroll in Chem 345 get a well-rounded introduction to the methods and concerns of organic chemistry. In the subsequent semester, Chem 348 students then spiral back through the same chemical concepts in a more rigorous way. This method of seeing it twice allows students to develop more abstract reasoning skills that allowed us to teach more interesting and modern chemistry. In addition, the successful PTL model was integrated into Chem 348 as a two hour per week “workshop” where peer facilitators model successful problem solving techniques. This effort was funded internally by a Provost’s Innovation in Teaching and Learning grant.

In 2006 I led the program to put all end-of-term course evaluations online so that more rich detail could be captured in the form of free format questions. We have continued this method and in spring semester of 2014 pilot tested the eXplorance Blue system that since has been adopted as the survey system for WSU. In addition, in 2006 I converted all Chem 345 lab experiments to online format and made them freely available to students. We are just beginning to explore the possibility with eXplorance Blue as an assessment tool. A draft fall evaluation for Chem 345 is included in Appendix 3 that details some of the metrics available with this tool.

In 2008, I created comprehensive online and freely available notes that allowed me to make the second semester organic chemistry a textbook optional course, thereby reducing the cost of the course for the student.

Within the past year I have been focusing on mapping learning goals to assessments and tracking student progress. I implemented a lecture technology called Bring Your Own Device (BYOD) that allows students to answer questions in lecture with rich content input (much deeper interaction than possible with “clicker” technology. I have also worked with Academic Media Services to have technology installed in Fulmer 226 that will allow for lecture broadcast streaming as well as technology that can capture lecture slides and board work. BYOD is particularly promising because of it can facilitate “on the fly” formative assessment. In addition, I was awarded funds last year to author web-based structure drawing questions that give students immediate feedback and that will work on a variety of computing platforms. I also served on the Learning Management Systems evaluation team that selected Blackboard Learn as a replacement for Angel so that these technology pieces can all function interactively in the same course website. Feedback is immediate and conceptual bottlenecks can be identified early and remediated. Finally, I have used social networking tools to foster engagement (see <https://www.facebook.com/groups/chem.345/> login “chem.345@wsu.edu” password “ochemistry”). I chose Facebook as a tool because it is both ubiquitous and allows students who are struggling with a problem to easily upload a picture and ask for help. TAs and tutors monitor this page and offer guidance but most striking, fellow students learn to assist those who are struggling without just providing an answer but through leading questions. Currently this single site has 921 members and past students continue to participate. I believe this is a rich area to develop as a teaching tool.

Among my future goals is to design and implement a high school/first-year university outreach research project in an effort to increase the number of successful STEM majors. A brief proposal is presented in Appendix 4 that outlines this goal.

5. Extraordinary efforts with special groups of students

I have participated in two Northwest Nations Upward Bound summer programs that ran through high schools serving primarily Native American students. In both of these programs, I brought high school students to WSU for up to three weeks in the summer where they learned basic chemistry that also included a lab component.

In 2011 I volunteered one morning a week for a year in a high school chemistry class in the White Pines school district. This is one of the most economically disadvantaged regional school districts and lacked any ability to provide lab experience or modern textbooks in the sciences. Working with Cengage publishing, we provided new textbooks and I worked with the chemistry teacher to update the curriculum. Together we developed labs that could be run on a budget and with minimal chemical waste. Of the 12 students who were enrolled in this course, 11 graduated with five of these going on to college. Quality science education in high school is a pressing national need and I plan on expanding this area of research.

From 1998 to 2002 I served as the faculty advisor to the American Chemical Society undergraduate Chemistry Club at WSU. During this time, student members routinely visited K-12 schools where they promoted chemistry and performed exciting lecture demonstrations. In addition, the club participated in fund raising and Mom and Dad's weekend chemistry demonstrations.

6. Use of disciplinary research in teaching

All of the curricular innovations from PTLT in 1998 to present are based on educational research. I myself have been an author of three educational research papers:

Quitadamo, I; Brahler, C.J.; **Crouch, G.J.** Peer Led Team Learning: A Prospective Method for Increasing Critical Thinking in Undergraduate Science Courses. *Science Educator* **2009**, *18*, 29-39.

Hines, S.A.; Collins, P.L.; Quitadamo, I; Brahler, C.J.; Knudson, K.D.; **Crouch, G.J.** ATLes: The Strategic Application of Web-Based Technology to Address Learning Objectives and Enhance Classroom Discussion in a Veterinary Pathology Course *J Vet Med Educ*, **2005**, *32*, 103.

Benefiel, Caleb; Newton, Ron; Grant, Karen; **Crouch, Gregory J.** Remote NMR Data Acquisition and Processing in the Organic Chemistry Curriculum, *J. Chem. Educ.* **2003**, *80*, 1494.

7. Out of class evaluation activities

Given the need for valid and reliable assessment instruments for critical thinking skills development, we have used the California Critical Thinking Skills Test to measure outcomes for specific research projects. The results of these studies are summarized in

Quitadamo, I; Brahler, C.J.; **Crouch, G.J.** Peer Led Team Learning: A Prospective Method for Increasing Critical Thinking in Undergraduate Science Courses. *Science Educator* **2009**, *18*, 29-39.

In addition, I have participated as a Regents Scholarship reader for the last three years.

8. Service on WSU or other committees.

At the university level, I currently serve on the Faculty Senate, Academic Affairs Committee, Regents Scholarships, CAS STEM center working group, as well as the Learning Management Systems Transition Team. I am also At the department level, I serve on the curriculum committee.

C. Evaluations

1. Course evaluations.

Below is a student evaluation synopsis from 2008 to present. From fall 2008 to fall 2013 WSU’s Skylight system was used where the “instructor” and “course” column labels represent a scale from 1-5 in terms of student satisfaction with overall instructor and course. Specific and open-ended questions are not included. Beginning spring 2014, these data are collected from the eXplorance Blue system in conjunction with the Office of Assessment. A sample course evaluation is provided in the appendix.

Year	Semester	Catalog #	Instructor	Course	Responses	Enrollment	%
2014	fall	345	3.8	3.2	188	223	84%
2014	spring	348	4.3	4.0	115	121	95%
2014	spring	345	4.2	3.6	181	215	84%
2013	fall	542	4.2	4.0	26	27	96%
2013	fall	345	4.0	3.6	263	322	82%
2013	spring	348	4.4	4.1	135	161	84%
2013	spring	345	4.1	3.6	190	242	79%
2012	fall	345	4.1	3.8	323	440	73%
2012	spring	348	4.3	4.0	111	128	87%
2012	spring	345	4	3.8	206	240	86%
2011	fall	345	4.3	3.9	294	331	89%
2011	spring	348	4.3	4.1	109	120	91%
2011	spring	345	4.1	3.7	169	209	81%
2010	fall	345	4.0	3.7	132	146	90%
2010	spring	348	4.4	4.1	90	114	79%
2009	fall	345	3.9	3.9	142	169	84%
2009	spring	346	4.0	3.9	63	120	53%
2008	fall	345	4.2	4	150		
2008	spring	346	4.2	3.9	66		

2. Measures of student learning

The only standardized tests available to test learning outcomes of students in the classes I have taught are available from the testing unit of the American Chemical Society. Unfortunately, these tests are multiple choice and lack the resolution necessary to be useful. Instead, we have used the California Critical Skills Test as a valid instrument to assess changes in a student's problem solving ability. This project is presented in Quitadamo et al. *Peer Led Team Learning: A Prospective Method for Increasing Critical Thinking in Undergraduate Science Courses*. Science Educator 2009, 18, 29-39.

3. Peer evaluations

Reports from Professors Jeffrey Jones and Cliff Berkman are included in Appendix 5 and 6.

D. Results

1. Student successes

Ian Quitadamo and Jenni Light are two PhD students whom I had the pleasure mentoring are now in tenured positions. I consider my work with Ian to be my most ambitious research project to date. Ian's success at Central Washington University is gratifying.

2. Contributions to the Scholarship of Teaching

As listed above, I have published three papers in education research journals.

E. Citations

1. Herschbach, Dudley. "Teaching Chemistry as a Liberal Art." *Liberal Education* 82, 4 (1996) 10-17
2. Tomorrow. The Report of the Task Force for the Study of Chemistry Education in the United States; American Chemical Society: Washington, DC, 1984; p 2.
3. The Liberal Art of Science. Agenda for Action. The Report of the Project on Liberal Education and the Sciences; American Association for the Advancement of Science: Washington, DC, 1990; p 11.
4. Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
5. Workshop Chemistry: Overcoming the Barriers to Success. (1996). *The Chemical Educator*. 1(1).
6. Impact of a spiral organic curriculum on student attrition and learning NP Grove, JW Hershberger, SL Bretz *Chemistry Education Research and Practice* 9 (2), 157-162

Appendix 1 – Example Assessment Instruments

Assessment exams are all cumulative and consist of three types of questions:

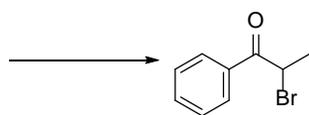
Example of Factual Recall. Here knowledge of acid/base chemistry as well as Lewis structure is assessed.

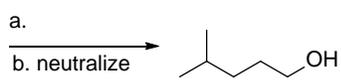
1a) Consider the reaction $AH^{(+)} + H_2O \rightarrow A^{(-)} + H_3O^{(+)}$. For the following named acids: **a)** draw the structure of the acid (1 point), **b)** give the approximate pKa of the acid (1 point), and **c)** draw the structure of the conjugate base (1 point). (12 points possible)

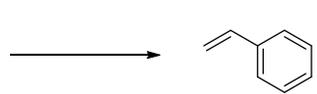
acid	<i>tert</i> -Butanol oxonium ion (C ₄ H ₁₁ O) pKa _____	Benzene sulfonic acid (C ₆ H ₆ O ₃ S) pKa _____	Phenol (C ₆ H ₆ O) pKa _____	Cyclopentadiene (C ₅ H ₆) pKa _____
	conjugate base			

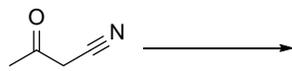
Example of Factual Recall. Here the ability to recognize functional group transformations based on a known set of reactions is assessed. In this type of question two clues are always provided

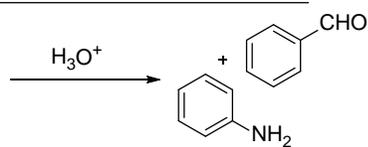
a)  type _____

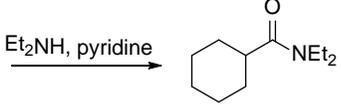
b)  type α halogenation

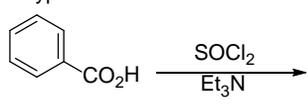
c)  type Grignard synthesis of 1° alcohol

d)  type E1

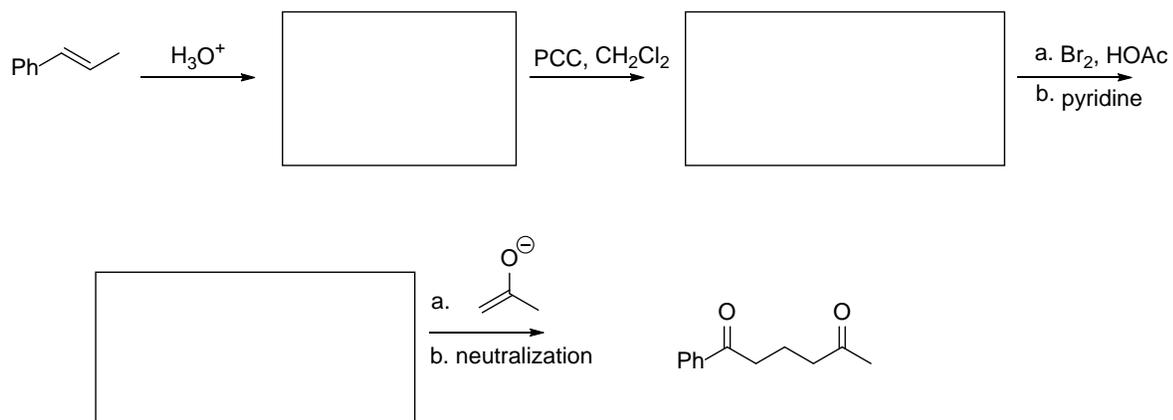
h)  type acid/base chemistry

i)  type _____

j)  type _____

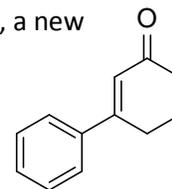
k)  type _____

Example of Scaffold Construction. Here hints are provided based off a known set of reactions



Constructed Knowledge is the highest order question and requires developed abstract reasoning skills.

When the diketone product in question 2 is subjected to sodium hydroxide in ethanol, a new α,β -unsaturated compound is produced (shown to the right). Using the curved arrow notation to denote bond making and bond breaking, draw a mechanism that accounts for this product formation. For full credit you must show all intermediates. (10 points)



Appendix 2 – Example Course Syllabus

CHEM 345 Organic Chemistry I Fall 2014

Instructors:

Dr. Greg Crouch, Fulmer 414
Dr. Jonel Saludes, Fulmer 170

Stockroom Manager:

Andrea Kirchner Loewus, Fulmer 435A

Prerequisite: A letter grade of C or better in Chem 102 or 106 or the equivalent course transfer.

Contacting Instructors and TAs: We will be using Blackboard Learn as our course website. All instructors and TAs can be contacted via BB Learn email.

Office Hours:

- Dr. Crouch: M/W/F 12:00-13:00 and by appointment; Dr. Saludes M/W 14:00-15:30 and by appointment
- TAs office hours are held in Fulmer 401 as well as Stevenson tutoring center. A schedule will be posted on the course website as well as on the door to Fulmer 401 no later than the first week of class.

Class Meeting:

- Section 1 MWF 11:10-12:00 Fulmer 226; Section 2 MWF 13:10-14:00 Wegner G50
- Prelab meeting times depend on section. All labs meet in Fulmer 438 beginning the week of September 8th. There is no prelab meeting on the first two weeks of class.

Course Website: All course material is on our website at:

- <http://elearning.wsu.edu/blackboard/>
- In addition, we have a course Facebook group page at:
<http://www.facebook.com/groups/chem.345>

Required Course Materials: This term will use Bruice's Organic Chemistry (7th edition) with Mastering Chemistry for online homework as well as Learning Catalytics for classroom response technology. There are three options:

- 1) You may purchase the book and Mastering Chemistry access for \$149.00 at Crimson & Gray or \$160.70 at the Bookie.
- 2) Crimson & Gray also provides a textbook rental option with Mastering access code for \$99.00. Be aware of the rental term is for a single semester.
- 3) For those of you with a laptop or third or fourth generation iPad (those with retina displays) you may opt for the eBook and Mastering Chemistry access for \$100.00 at Crimson and Gray or \$109.30 at the Bookie. Please be aware that if you select this option, the only tablet that displays the eBook well is an iPad with retina display. Laptops all work but Android devices shrink the size of the text so it requires magnification and thus is not easy to read.
- 4) You may also purchase Mastering Chemistry with or without the eBook when you register through Blackboard Learn.
 - a. The cost is \$90.00 Mastering Chemistry with the eBook or,

- b. \$66.00 for Mastering Chemistry without the eBook. This option requires a separate purchase of Learning Catalytics for \$12.00 that brings the total cost to \$78.00.

Mastering Chemistry and Learning Catalytics are necessary for whatever option you select. Mastering Chemistry support can be found at <http://247pearsoned.custhelp.com/> In addition, WSU is a priority customer so you have access to phone tech support at 855-875-1797. If you contact support let your agent know you use Modified Mastering that is connected to BlackBoard Learn.

In addition to the text and Mastering Chemistry shown above, you will need an organic model like. These can be very expensive so be careful. A cheap model kit is http://www.darlingmodels.com/Individual-Orders-Molecular-Model-Kits/KIT-3-ISBN-978-09648837-4-1-MOLECULAR-VISIONS-Organic-Kit/prod_7.html Model kits can also be purchased on eBay or Amazon for a reasonable price. It is essential you have a model kit before the first exam.

Course Objectives and Description: Students completing Chem 345 will be able to

- 1) Rationalize molecular reactivity based on functional groups,
- 2) Master the foundational knowledge necessary for success in Chem 348,
- 3) Master simple laboratory methods dealing with compound separation, identification, and synthesis, and
- 4) Safely manipulate chemical compounds and understand chemical hazards in the laboratory.

Lecture Course Description: The Chem 345 curriculum is based on the “survey of functional groups” approach to teaching organic reactions and mechanisms. Each week we will be exploring a different type of organic compound. Please consult the lecture topic outline section of the course web site and keep up with reading and homework.

Lab Course Description: Chem 345 has a laboratory component that meets once per week for 3 hours. In order to pass the course, you must complete and pass all of the labs. You are not required to purchase any lab manuals as all printed materials are freely available on the course website. You are required to purchase a lab coat as well as goggles.

You must complete and turn in all of the labs in order to pass this course. In other words, failure to turn in a lab report at the end of the term will result in an automatic failing grade. Lab attendance is mandatory. If you miss a lab, there will be a make-up session at the end of the semester; you may make up a maximum of two labs. If you miss more than two labs during the semester without an excellent reason, you will automatically fail the course. If you cannot attend lab, you must contact your TA before the scheduled lab time.

All labs must be turned in directly to your TA the week following their completion or to the Organic Stockroom Fulmer 435 (Manager, Andrea Kirchner-Loewus). Your TA will sign the report acknowledging receipt and Andrea or the Organic Stockroom staff will date-stamp them.

Early Policy: You will receive 0.25 points EXTRA CREDIT for each day you turn in your lab prior to the due date (maximum of 1 point per lab). If you wish to turn in a lab early, give it to your TA directly or Andrea/Organic Stockroom staff in 435 from 10-4 pm, Monday-Thursday (closed Fridays).

Late Policy: There is none. It has been superseded by the Early Policy. Labs turned in after the due date will be scored as a 0 (zero) and counted as a completed lab and thus cannot be made up at the end of

the semester. If no stockroom personnel are present to accept your lab, you may drop it through the mail slot on the door to Fulmer 435A.

Student Learning Outcomes:

- Use chemical acid/base reactivity to predict chemical equilibrium.
- Describe chemical reactivity in terms of organic functional group chemistry, including functional group transformation.
- Interpret structural changes within a chemical framework considering bond making and bond breaking.
- Propose reasonable mechanisms that convert starting materials to product
- Interpret stereochemical data that informs a mechanistic hypothesis.
- Plan an organic synthesis using a retrosynthetic approach based on known chemical reactions.
- Develop skill in safe chemical handling, measurements, experimental technique, and simple synthesis.

Assignments & Grading Policy: This course will be graded on the basis of homework, two midterm exams, a comprehensive final exam, lecture participation, and lab.

Homework: We will be using Mastering Chemistry for online homework this term. All assignments will be accessible through Blackboard Learn and count at 10% of your grade.

Midterm exams: Two hourly exams will be administered to assess subject mastery. These exams are not multiple choice. Prior semester exams are provided on the course website. The second midterm exam (as well as the final) are comprehensive. Each midterm exam is 20% of your grade. If you miss a midterm exam, your final will count at 45%

Final exam: A two-hour comprehensive final exam will administered at the end of the course. The final exam is worth 25% of your grade.

Lecture participation: Learning Catalytics will be used to assess lecture participation. Lecture participation is worth 5% of your grade.

Lab: Completing all 12 labs is required to pass this course and will count at 20% of your grade.

Assessment: Student Learning Outcomes 1 and 2 will be assessed entirely using hand-graded exams. We do not use multiple choice exams so we can assign partial credit for reasonable answers. Any chemical separations theory necessary to Student Learning Outcome 3 will also be assessed using exams. The remainder of outcomes 3 and 4 will be assessed by graded lab reports.

Grade Scale: This course will use the following grade scale. Please note this scale may change slightly from year-to-year.

A	92-100	B	83-85	C	72-76	D	61-64
A-	89-91	B-	80-82	C-	69-71	F	<60
B+	86-88	C+	77-79	D+	65-68		

Grade Summary: The breakdown for each of graded component is show below, along with their weight in percentage. A sample calculation is also provided.

		<i>sample calculation</i>					
<i>graded components</i>	<i>weight</i>	score	x	weight	=	weighted score	
homework	10%	70	x	.10	=	8.5	
test 1	20%	67	x	.20	=	13.4	
test 2	20%	72	x	.20	=	14.4	
lecture participation	5%	90	x	.05	=		
final	25%	75	x	.30	=	22.5	
lab	20%	92	x	.20	=	18.4	
	100%	sum					77.2

In the sample calculation above, the composite score of 77.2 would round to 77 and correspond to a letter grade of C+ according to the grade scale. However, since the final exam is comprehensive, we also consider that score alone and if it is better than the composite score, that will be the grade awarded. For example, if your composite score was 77 (a letter grade of C+ from the table above) but your comprehensive final exam score was 80, you would be awarded a grade of B-

composite score	final exam	best score	best letter grade
77	80	80	B-

We do not give make-up exams. If you miss one hourly exam, the final exam will increase to 45% of your course grade. To pass this course, you must complete all of the labs. If you miss a lab, there will be make-up times available.

Test Schedule: All tests and exams are evening exams. If you off campus due to a university sponsored event, you may arrange for an academic counselor to proctor the exam. You must make these arrangements within the first two weeks of the semester. If you miss an hourly exam, the final exam will count at 45%.

- Test 1, Tuesday September 30th from 5:30 to 7:15 pm in Todd 116 & Fulmer 226
- Test 2, Tuesday November 4th from 5:30 to 7:15 pm in Todd 116 & Fulmer 226
- Final Exam, Wednesday December 17th from 7:00 to 9:00 pm, location TBD

All exams are written for a standard one hour time frame so it is permissible start the exam up to 6:15 pm and still have time to complete the exam. Officially approved and scheduled night examinations have priority over all other academic and non-academic evening activities. (Academic Rule 76). If you have a conflict with another evening academic activity such as a biology or physics lab course, talk with the lab instructor and ask for an alternate time. There is no penalty for missing an hourly exam as it simply increases the weight of the final exam. Do not make travel plans before the final exam. Your travel cannot be accommodated.

Test Policy and Regrades: Bring only your student ID, a model kit, and pencils to the exams. You will be provided scratch paper. You may not bring any electronic or internet connected device to the exam. Doing so will result in a failing grade and be interpreted as a breach of academic integrity and will be

reported. Once exams have been graded, you may pick them up from the stockroom. Look over the exam carefully and make sure the points have been added correctly. If you find an error or have a question about the grading of the exam, return it to the stockroom attendant with a regrade request form attached (you can get these from the stockroom or on the course website) – we will not re-grade an exam once you remove it from the stockroom. Be very clear when completing the regrade form. For example, “there is an error in my total points” or “on question 2, I drew the correct intermediate structure....” Avoid requests that include “I feel as if I deserve more points.”

Lecture Schedule

Week	Starting	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	August 25	Lecture 1		Lecture 2		Lecture 3
Week 2	September 1	Labor Day		Lecture 4		Lecture 5
Week 3	September 8	Lecture 6		Lecture 7		Lecture 8
Week 4	September 15	Lecture 9		Lecture 10		Lecture 11
Week 5	September 22	Lecture 12		Lecture 13		Lecture 14
Week 6	September 29	Review	Test 1	No lecture		Lecture 15
Week 7	October 6	Lecture 16		Lecture 17		Lecture 18
Week 8	October 13	Lecture 19		Lecture 20		Lecture 21
Week 9	October 20	Lecture 22		Lecture 23		Lecture 24
Week 10	October 27	Lecture 25		Lecture 26		Lecture 27
Week 11	November 3	Review	Test 2	No lecture		Lecture 28
Week 12	November 10	Lecture 29	Veteran's Day	Lecture 30		Lecture 31
Week 13	November 17	Lecture 32		Lecture 33		Lecture 34
	November 24	Thanksgiving Vacation				
Week 14	December 1	Lecture 35		Lecture 36		Lecture 37
Week 15	December 8	Review		Review		Review
Finals	December 15			Final Exam 7-9 pm		

Lecture Topics: Given that we will only cover selected sections in the required textbook, the following map is provided. It is extremely important that you follow this map when studying for this course. Sections that we will not cover will be explicitly listed below. In addition, we will not cover all reactions listed in each section, therefore a reactions list will be provided by chapter to help you focus on the necessary functional group transformations. Lecture slides will be available for download on the course website.

Chapter 1 – Remembering General Chemistry: Electronic Structure & Bonding. This chapter should be review from general chemistry.

Section 1.1 Pay attention to the definition of isotopes.

Section 1.3 is a particularly important review

Section 1.4 reviews how to draw Lewis structures and determine formal charge. This task is required throughout the semester on both homework and exams.

Section 1.6-1.15 will be thoroughly reviewed in lecture

Chapter 2 – Acids & Bases: Central to Understanding Organic Chemistry. As with Chapter 1, much of the information in this chapter is a review of concepts presented in general chemistry. It is essential that you develop a strong command of acid/base chemistry.

Section 2.10 will be covered in a worksheet lab

Section 2.11 may be ignored

Chapter 3 – An Introduction to Organic Compounds: Nomenclature, Physical Properties, & Representation of Structure

Section 3.15 may be ignored

Chapter 4 – Isomers – The Arrangement of Atoms in Space. This chapter is made difficult because of the need to recognize three dimensional arrangements of atoms. On every exam, you will be allowed to use your model kit.

Sections 4.10, 4.15, & 4.16 may be ignored

Chapter 5 – Alkenes: Structure, Nomenclature, & an Introduction to Reactivity. We will deal very qualitatively with the concepts presented in this chapter. You will not be required to perform any calculations.

Chapter 6 – The Reactions of Alkenes: The Stereochemistry of Addition Reactions

Sections 3 6.3, 6.7, 6.8, 6.14, 6.16, & 6.17 may be ignored

Chapter 7 – The Reactions of Alkynes: An Introduction to Multistep Synthesis

Sections 7.5, 7.6, 7.7, 7.8, & 7.12 may be ignored

Chapter 8 – Delocalized Electrons & Their Effect on Stability, pKa, & the Products of a Reaction

Sections 8.11, 8.12, 8.14, 8.18, 8.19, 8.20, & 8.21 may be ignored

Chapter 9 – Substitution Reactions of Alkyl Halides

Sections 9.7 & 9.9 may be ignored

Chapter 10 – Elimination Reactions of Alkyl Halides: Competition Between Substitution & Elimination

Chapter 11 - Reactions of Alcohols, Ethers, Epoxides, Amines, & Thiols

Sections 11.8, 11.10, & 11.12 may be ignored

Chapter 16 – Reactions of Carboxylic Acids & Carboxylic Derivatives

Sections 16.18, 16.22, & 16.23 may be ignored

Chapter 17 – Reactions of Aldehydes & Ketones: More Reactions of Carboxylic Acid Derivatives. Reactions of α,β -Unsaturated Compounds

Sections 17.5, 17.6, 17.8, 17.9, 17.11, 17.14, 17.15, 17.16, & 17.17 may be ignored

Chapter 18 – Reactions at the α -Carbon of Carbonyl Compounds

Sections 18.5, 18.7, 18.8, 18.21, & 18.22 may be ignored

Chapter 19 – Reactions of Benzene & Substituted Benzenes

Sections 19.10, 19.11, 19.17, 19.18, 19.20, 19.21, 19.22, 19.23, 19.24, & 19.25 may be ignored

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist

Academic Integrity: You are encouraged you to work with classmates on assignments, however, each student must turn in original work. No copying will be accepted. Students who violate WSU's Standards of Conduct for Students will receive an F as a final grade in this course, will not have the option to withdraw from the course, and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions. In addition, if during an exam you use an internet connected or other electronic devices, you will fail the exam and be reported as described above.

Safety Statement: Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors. It is highly recommended that you review the Campus Safety Plan (<http://safetyplan.wsu.edu/>) and visit the Office of Emergency Management web site (<http://oem.wsu.edu/>) for a comprehensive listing of university policies, procedures, statistics, and information related to campus safety, emergency management, and the health and welfare of the campus community.

Appendix 3 – eXplorance Blue Evaluation

**Fall 2014 Instructor Report - Chemistry for CHEM 345.01-PULLM-3597
Organic Chemistry I (Gregory Crouch)**

2014 Fall Chemistry Course Evaluations

Project Audience 223

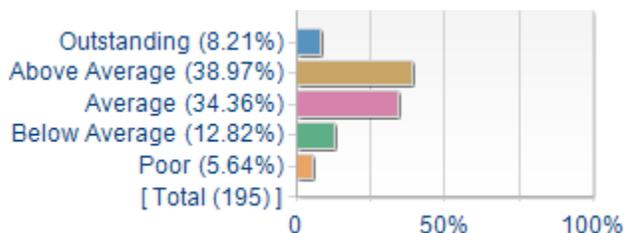
Responses Received 195

Response Ratio 87.44%

Creation Date Wed, Jan 07, 2015

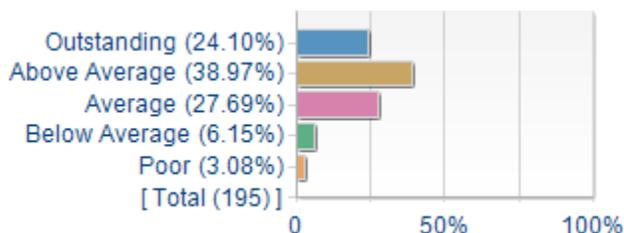
WSU Department of Chemistry Course Evaluation Instructor Report Fall 2014.

Overall rating of the course **CHEM 345.01-PULLM-3597 Organic Chemistry I:**



Statistics	Value
Response Count	195
Mean	3.31
Median	3.00
Mode	4
Standard Deviation	+/-0.99

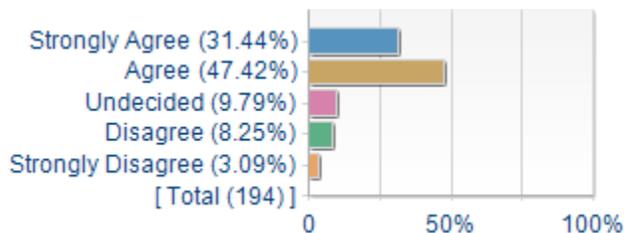
Overall rating of course instructor **Gregory Crouch:**



Statistics	Value
Response Count	195
Mean	3.75
Median	4.00
Mode	4
Standard Deviation	+/-0.99

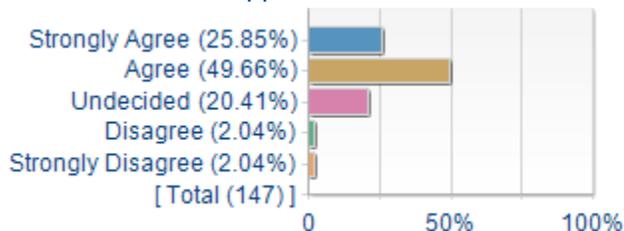
Please evaluate your course instructor **Gregory Crouch:**

1. The course instructor was an effective teacher.



Statistics	Value
Response Count	194
Mean	3.96

2. The course instructor was available during office hours or scheduled appointments.

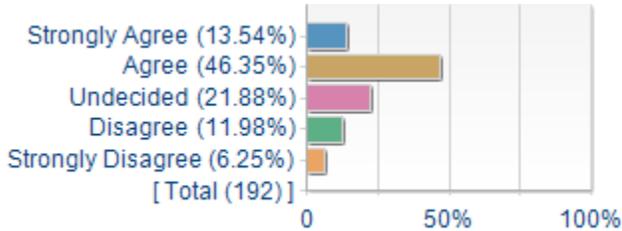


Statistics	Value
Response Count	147

Median	4.00
Mode	4
Standard Deviation	+/-1.01

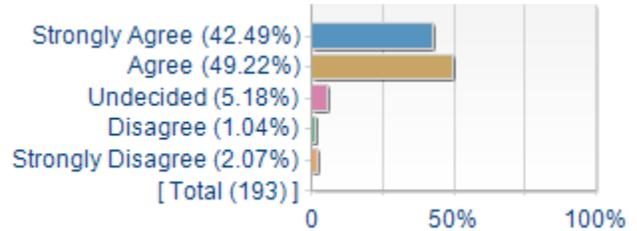
Mean	3.95
Median	4.00
Mode	4
Standard Deviation	+/-0.85

3. The instructor was responsive to and respectful of students' concerns.



Statistics	Value
Response Count	192
Mean	3.49
Median	4.00
Mode	4
Standard Deviation	+/-1.07

4. The instructor covered the material in a timely manner as outlined in the syllabus.



Statistics	Value
Response Count	193
Mean	4.29
Median	4.00
Mode	4
Standard Deviation	+/-0.79

Student Comments on the instructor below.

Please add any additional comments here on the course instructor **Gregory Crouch** only:

Comment
His teaching method is not efficient. He devoted himself into the contents he taught, however, it was just like a self performance without any considerations of the audience.
I thought that we went through the course Material a little too quickly.
I loved your strict guidelines, it keeps students accountable. You were awesome :)
We covered to much material to quickly
Did not feel fully prepared for exams.
It was good when he would explain the mechanism simple but it is a little hard to understand sometimes.
He just flies through lecture...slow down
Dr. Crouch was a very fair professor. He was also an outstanding lecturer as he got in to his lectures and wasn't afraid to joke with students. It should be noted he draws absolutely beautiful hexagons.
He is an excellent professor because he actually explains in detail what we are going to be learning on the test, most of the time.
As a transfer student and taking organic chemistry from another instructor, I am thrilled to say that Dr. Crouch does an outstanding job teaching and helping students understand organic chemistry. By far one of the best instructors I've had throughout taking chemistry courses.
I'm sure you're a good instructor, I'm just biased about this course since I don't see why I have to take it, I don't see how O-Chem relates to my major at all
In class I thought he was clear with his teaching.
explained material well and what he expected of us
This professor, even though I know I personally lost interest for the material because of personal reasons, is a phenomenal professor. He was very engaging and when students had a question he promptly answered with understandable terms and most often than not witty humor. Objectively a very good teacher. Give him a raise. Or free coffee for life.
He is incredibly knowledgeable in the subject and wants the students to succeed.
Good teacher, knew his stuff.
We went fast at sometimes and moved on too quickly on tough concepts.
Very good at lecturing and clear on what is expected of students.
Dr. Crouch treated student comments during lecture very disrespectfully. I chose not to ask questions in lecture or even attend his office hours for this reason. The schedule in the syllabus was extremely vague as to what material would be covered and by when. I also never had enough time to take thorough notes on the lecture slides. Often, I ended up just listening in lecture and going back after class to take notes on the lecture slides. It would be helpful to have the mechanism on one screen and then the other slides/details on a different screen.
Dr. Crouch is clearly very knowledgeable of the subject, but had somewhat of a condescending demeanor when talking to students/answering questions in class. For the most part, I appreciated his "no bs" attitude but at times it seemed more disrespectful than effective.
Always extremely organized and effective in notes and lecture.
Dr. Crouch was an amazing professor! He has made what I thought would be my most difficult class into my easiest through his teaching. Although I inadvertently added a year on to my education by taking Dr. Crouch's section of Organic Chemistry rather than a conflicting prerequisite for my junior Bioengineering courses next semester, I do not regret it! Crouch has inspired me to pick up a Chemistry minor using the extra year I'll be here, and I look forward to having him for Chemistry 348 next semester.
There was a tendency in your lecture for you to come off as intimidating which may be part of the reason it was hard to get an answer out of the class at times. Sometimes you moved a bit too quickly for students to understand the material

being taught and this did not allow enough time for them to process the information in order to be able to ask. Aside from that I appreciate how organized you were and that you were true to your word when you made promises.

Possibly have the homework more of a participation credit than graded. But other wise, you explain things really well. I enjoyed how some days, you will go back to what we learned in a previous class to make sure we understood it.

I feel that at times he went very quickly through the material. Some of the reactions we needed to know were also a little unclear when going to lecture.

May be because of a clash in personalities, but he did not feel approachable nor understanding if a concept was not understood on the first try.

Cool dude

Very effective teaching style.

Outstanding Teacher!

Crouch really knows Chemistry and really enjoys it. I find the latter the reason that allows him to teach so well. He is good at deconstructing complex scientific material and make it consumable for the average student.

Dr. Crouch is an extremely unapproachable person. Students are intimidated by him and therefore do not ask questions. Asking questions in OChem is EXTREMELY important due to the difficult subject matter, and I honestly believe that students would get better grades in this course if we had a different instructor. OChem is an incredibly important class for many pre-health students, and the grade we receive in this class can affect our admittance into graduate programs. Dr. Crouch does not help us achieve success in this class.

I don't know if it's the new book and lecture lay out, but in class we went through everything so fast that I depended on the book to learn.

Good professor, understands that the material is hard for his students

Occasionally replied to students' questions in a sassy manner making them feel dumb, so maybe try to limit this. Otherwise, a great professor!

Often comes off as rude when students ask administrative questions about their grade and whatnot. Crouch is demeaning in the fact that he expects you to be on his level of understanding of all the reactions, but he needs to break it down and be more thorough. All in all, remember that students are there to learn and get a good grade and you should help them do both without a rude demeanor.

Focus more on teaching to be sure the concepts are clear to the students. The concepts that were "taught" by you in class were hard to understand, but much easier when others taught explained them. I know there is a lot of material to cover so you have to go fast, but taking the time to make sure students understand, or somehow forcing students to participate would make you a far better and effective teacher. The knowledge you have of chemistry is admirable, but your actual teaching skills are sub-par.

Very straight forward and made the concepts easy to understand

Dr Crouch was very good at coming up with visualizations that caused "light bulb moments" for us students. He was also very good at making us be involved during class by asking questions aloud and not moving on until we actually gave an answer. I felt he moved at the perfect speed to allow extra time on the hard to grasp topics and always had time for review the day before the test which I appreciated.

great teacher!!

His arrogance makes it very difficult to learn from him.

Answered questions in class, which was extremely helpful. Recommend going over learning catalytics at the end of class

Wonderful teacher, funny, kept class interesting but was not good at email correspondence. Emails were either left unanswered or responded to unprofessionally.

Overall a good professor because he was well organized despite trying out a new system and was knowledgeable. However, since the first week of class I learned how sassy he was and never asked questions in class or went into his office hours, I did not feel worthy to go into his office hours because I never not continuously study in a group.

I was a little scared to ask questions because sometimes especially he was rude to students who asked questions but he was overall knowledgeable and thorough.

I enjoyed the act that you incorporated social media into this class. I found the facebook page not only useful, but it also encouraged me to ask questions and help others understand the problems.

He did everything he could in order to ensure that students could learn and do well in the class

Using PowerPoint slides didn't work very well. Although it allowed a more fast pace, I think if he slowed down and took the time to DRAW the mechanisms, it would be easier to understanding.

It is very helpful when you take the time to explain certain concepts on the projector. Learning Catalytics questions were helpful as well.

Greg Crouch needs to learn to speak with authority. Also, he is kind of rude when class asks questions in lecture.

Although Crouch is a wonderful teacher, the material is extremely hard with a lot of memorization so I would recommend a cheat sheet type thing or a large curve on the class overall.

I felt that he was very good at teaching and knew the subject extremely well. He provided lots of examples and moved through the material at a good pace.

He is a very good professor, but just sometime he speaks so fast in lecture.

material was covered too fast for a through understanding, as such, most of the information i have taken from this course was from either the Pre lab lecture, or on my own time. He included a lot of information in his powerpoints, and then elaborated on them. Even with printed out copies of the powerpoint it was not possible to keep even close track of everything he was teaching

I found him to be very rude. He would only fondly interact with students who sat within the first five rows. Some students cannot make it to class in the 10 minute passing and therefore sit in the back so as not to disturb the class, yet Dr. Crouch's response was that students in the front don't bite. Yet they do all sit on the outside of rows making a lot of trouble and commotion to sit in the front. After saying he wanted students to sit closer, he shut off his mike and made it impossible to hear from anywhere from halfway back.

The pace at which the material was covered was too fast.

Dr. Crouch's teaching style shows he cares students learn the material and cares about the course material.

Good instructor, but often sassy. I love it.

Great overall teacher, just a very difficult class to follow so I think moving slightly slower would make all the difference. I do understand there is a lot of information to cover though.

He expects you to meet in a group more than once a week to study. That's just not possible if you have over 10-20 hours of work each week on top of other classes and trying to coordinate people's schedules.

I was really unimpressed by Dr. Crouch's sarcastic answers to students who were failing to understand the material. It created an environment where the class was afraid to ask questions for fear of an eye roll or comment about how we should know all the things he teaches.

He spoke to fast during lecture that I could not take notes. His lecture slides were not helpful and the over all teaching style was no conductive at all. I would have preferred to read on my own time and come to class and do examples as well as ask homework questions. However, instead I got 1 or 2 exams that were not similar enough to issues I was having and he just reiterated the textbook.

He is completely unapproachable. His emails are excessively rude. He makes sure that he manages to insult students at least once a lecture both on an intellectual way and personal. He also seems to expect students to understand the material right away and also learn the same way. If a student does not follow his "rules" like making flash cards and joining study groups, he refuses to help them despite their circumstances.

Overall, he is a rude person who refuses to help his students. If his attitude were to change and he was more helpful, I am sure he would have a wealth of knowledge to share.

One of the better chemistry teachers I've had.

went too fast during lectures, serious disconnect between what was on the homework and what we were tested on.

He is wonderful professor in the WSU! :)

He's very knowledgeable about organic chemistry.

I really enjoyed this class actually. I liked how you took the time to draw stuff out in class so we could really understand the material.

I struggled a ton with this course, but it was never once because of the teacher and solely because of the material. I would dread the thought of taking this course with another teacher. Thanks professor Crouch.

You were slightly intimidating making it scary to ask questions because of your normally sarcastic responses.

I think that having such a large class this semester made the instructor stressed. I had him last semester with a class about half this size, and he encouraged questions, and was eager to help the students learn. This semester, you could

tell he wanted to do that but sometimes he would brush aside questions to stay on task for the lecture material, or he would respond in a callous way.

Cramming so much material in the first semester is an ineffective way to teach. Instructor also had a poor attitude towards students, this caused many to avoid asking questions

Powerpoint slides are useless if one goes too fast to understand them.....

Dr. Crouch was an excellent lecturer.

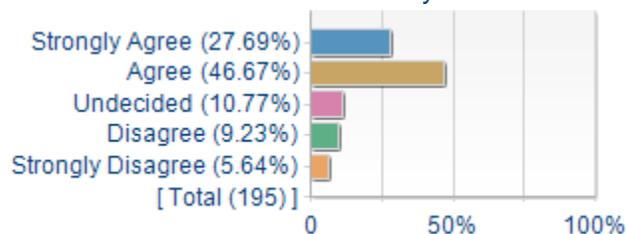
Extremely good at presenting the material in an easy to understand way. I liked all of the explanation of real world utility in what we were learning, it really helped motivate me to learn. Clicker questions were great as well.

Slightly condescending to students that asked questions and it actually detoured some students from asking questions in lecture (I heard this from more than a few students).

Please evaluate CHEM 345.01-PULLM-3597 Organic Chemistry I:

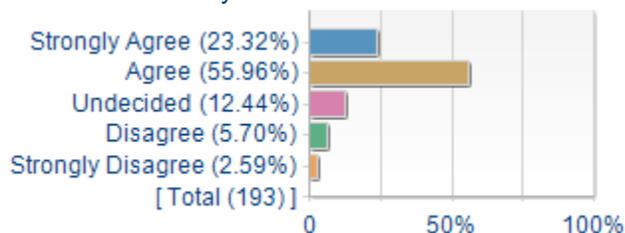
Course Questions

1. I found this course valuable to my education.



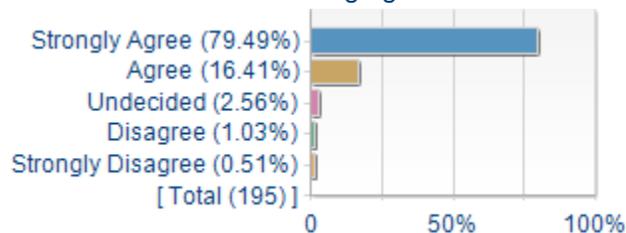
Statistics	Value
Response Count	195
Mean	3.82
Median	4.00
Mode	4
Standard Deviation	+/-1.11

2. Exams and quizzes were appropriate and based on material in the syllabus.



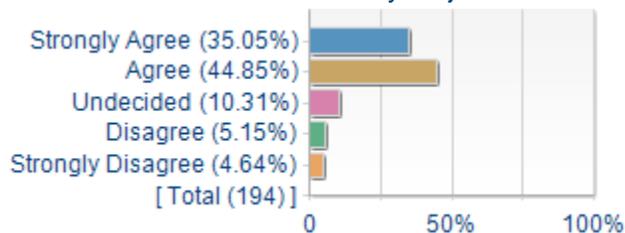
Statistics	Value
Response Count	193
Mean	3.92
Median	4.00
Mode	4
Standard Deviation	+/-0.90

3. I found this course challenging.



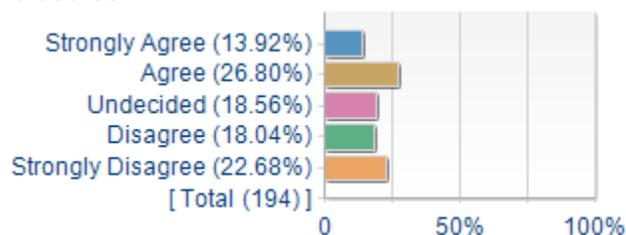
Statistics	Value
Response Count	195
Mean	4.73
Median	5.00
Mode	5
Standard Deviation	+/-0.61

4. This course was relevant to my major.



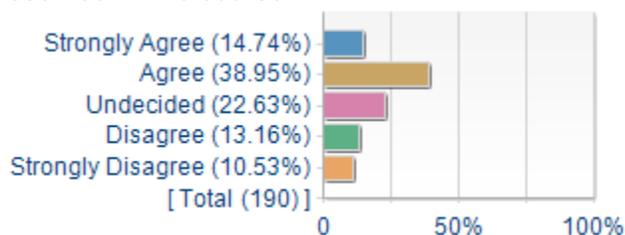
Statistics	Value
Response Count	194
Mean	4.01
Median	4.00
Mode	4
Standard Deviation	+/-1.04

5. I am excited about chemistry after having taken this course.



Statistics	Value
Response Count	194
Mean	2.91
Median	3.00
Mode	4

6. The textbook helped me understand materials presented in this course.



Statistics	Value
Response Count	190
Mean	3.34
Median	4.00
Mode	4

Standard Deviation	+/-1.38	Standard Deviation	+/-1.19
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Please add any additional comments here on **CHEM 345.01-PULLM-3597 Organic Chemistry I**

Comment
Very difficult course almost solely based on memorization.
I understand that the material itself is very difficult for most people to grasp, and that you guys are doing a lot of new things to help accommodate for that. It was still exaggeratedly difficult though. This is the type of class that you can do everything right for, and spend every available moment in Fulmer 401 or CUE 503 (where ever the tutoring happens to be available at that moment) and still just not pass the class. I suppose my only suggestion to help with that would be to maybe have more hours available(during the weekends, for example) and provide more semi-easy busy work to balance out the soul crushing, humbling exams
Although I found this course to be very difficult, I rated it "above average" because I feel that I should not bring the average rating down simply because I found it extremely challenging and stressful.
I did not use the textbook after the first chapter because I found it useless compared to material I could find online. Online resources are far better at explaining this material from a beginner perspective.
Very difficult course, but it is a good weed-out course for pre-health.
I feel like the exams only covered a limited amount of material and were not similar to the homework problems that everyone was used too. The exams were Almost completely made up of material learned the week before the exam which coincidental was the hardest material of the until! Other than that the course was great!
Very informational class.
It was a good class, though extremely challenging.
I really don't see why I have to take this class when I'm a zoology major, the only thing its doing is killing my GPA
This course is very hard.
hated this course, too much to memorize along with a full course load
This course was very challenging, however could have been made easier if pages from the text were outlined in the syllabus versus the chapters only. The reason for this is because the chapters are frequently large and trying to base what is needed to be known from the lecture is sometimes difficult when the slide is partially unclear without the professor. I found myself disregarding the book.
Difficult class
Overall, I enjoy chemistry but found the course defeating. I'm a graduate student working on herbicide resistances so I wanted knowledge in organic chemistry but found this course so overwhelming I have been just trying to keep up (and stay alive). I enjoyed the lab a lot and it helped to make things connect.
Very challenging but definitely enhance my understanding of chemistry.
I honestly hated this class. It was so difficult to keep up and understand to the level that we were tested on, that it was very easy to become extremely discouraged. This class truly made me want to drop out or at least change my major. I spent hours studying but still failed both midterm exams.
This class was quite difficult. Although I understand the complexity of organic chemistry is difficult to teach in a semester, there should be more organized help outside of class.
Possibly a curve similar to the physics one because this class is more difficult or have homework count for participation and not on accuracy.
I had a hard time with this class, so I do not want to give it a good grade. Its a tough and demanding class.
I really like chemistry, what can I say. I especially like organic chemistry. It has an enjoyable challenging feel to it where I am required to think on a more complex level that just basic memory.
The way the material was presented was very confusing. It would have been helpful to have learned general mechanisms rather than using a bunch of examples to teach us.
This class is terribly hard. Wanted to die the whole time I was taking it
Crouch always said to just use his slides instead of the book, so it would be helpful to let the students know that prior to them purchasing the book so they can save money!
More real world connection would be nice.

Way too much specific material packed into one course to memorize all of it.

I felt like the text book was amazing in helping me understand the concepts, except for the last few chapters because we couldn't learn everything to that point and had to skip a lot of sections. Many times in the last few chapters it would be talking about something I hadn't learned about as an example or explanation which made it harder to follow at times. But if that's what it takes to make the book cheaper I say stick with it.

book was not that helpful

It is made unnecessarily difficult.

This course has the worst book I have ever had

NA

This class was very challenging and contained a lot of material to know for the final exam.

The book was almost \$200 and was not needed for this course! I didn't open it once and am getting an A or B out of this course! \$200!!!!

Exams were tough but that was to be expected.. hopefully I aced the final! ha.

This class is one of the most challenging classes at any university and especially challenging at WSU. If there were less reactions that we had to know then it would not be as difficult but I feel the goal is to make it is difficult.

Very difficult but it is made clear what you need to do to pass and you just need to start studying early.

I found there to be a disconnect between the textbook being used and the slides. The slides provided by the professor was much more effective in fostering my learning

Memorization being the most important skill to have going through this course, made the material and the exams extremely difficult for those who focus more on learning and understanding. Too much memorization made learning almost impossible.

it is a hard class and requires a good professor.

This was the most difficult chem class I've ever taken.

This was one of my most challenging class but I really enjoyed this class overall. It just requires a lot of work if you want to succeed.

Please do not give students a hard time to get an A in this class

This is a very hard class, Dr. Crouch did alert us of that, yet he did not seem to have any interest in helping those who were falling behind.

Very difficult course however I did not take advantage of all of my learning opportunities throughout the semester.

Extremely difficult. Learning catalytics and homework did help, but exams are still hard. I wish there would be at least some multiple choice questions because then I have more confidence as I can narrow down the options to two. A comprehensive final is also a lot to study for, given we have other exams. It would be nice if it was just "Exam 3" or semi-comprehensive instead.

I also wish they had tutoring at a different time because it was always during my work!

Online textbooks are a sham. I personally hate them because I get charged some high sum of money for something that doesn't cost anything to make. Organic chemistry makes me fear chemistry more than anything

It is hard to rate a course in which a person did not get the best experience possible.

Extraordinary amount of memorization required

A difficult subject made even more difficult by too fast a pace, complicated explanations and a serious disconnect with how students actually learn things.

Love it

Please add any additional comments you feel relevant on help received outside of class in CHEM 345.01-PULLM-3597 Organic Chemistry I:

Comment

The only time I needed help before lab and went to 401 there were no TAs so I had to ask other students for help.

RIGHT, so as an individual who lived in the tutoring areas any time that wasnt preoccupied with non-negotiable engagements I have a lot of feed back about the tutors and TA's. The helpfulness of the tutors/TA's ranged from: "seriously considering paying them to see them for further tutoring out of hours" to "I know more than this guy, why is he even here?" the following list is a summary of my experiences with the TA's/tutors this semester.

Brian: give this guy a raise. give him more hours. something. he goes above and beyond, and if he even suspects confusion he spends another 5 minutes going over parts of a mechanism he already explained. In my opinion, he is the best TA in the course.

Matt: another awesome tutor. he is very approachable, and even if you dont ask for it he draws out the mechanisms on the board if you seem confused.

Ingrid: Just awesome. She is really enthusiastic about helping others to understand this subject. Sometimes she cuts the info a little bit short if there are more people needing assistance, or looks bothered if you ask a question if its really busy. But overall she just oozes a helpful attitude and applies a variety of learning methods to the people she assists.

Desiree: see above

Ben: Focuses on teaching students based off of what they already know, and helping them to piece together new knowledge based off of connections between previously established knowledge. A very good method, although a little lengthy in implementation. Overall a wonderful TA.

Erickson: an awesome TA, although when asked "why does this happen" he has a tendency of responding with "so this end result will be achieved" as opposed to, well, why the end result happens.

Jon: very eager to help, but often tells students to "look it up" when asked a simple-ish question. Not in a sassy way, he just doesnt understand that some people learn better through verbal communication than through written word. So, as he has points out often, "just telling" us WOULD actually "benefit our education".

Chase: very unapproachable. has a group of students (most likely his lab section) that he is very friendly with, and when somebody else asks a question he seems peeved. He also gets frustrated when students are having a difficult time understanding a concept, and in my experience it has discouraged me from asking him for help.

Jose: Also very unapproachable. he will help if you ask, but it seems forced if you arent one of his regulars.

Armando: Consider not hiring him again. 90% of the time when you ask a question he doesnt know, or when asked why responds with the question you asked. he seems to not understand the material, and often gives wrong advise on homework only to amend it after the submission and point deduction. He cuts people off when they ask questions, and gets frustrated when you dont understand and instead of trying to rephrase it in a way that you do he just brushes students off and moves on to the next person.

Jianming: After attempting to get tutoring from him 3 times total, I now dont go and see him if he is the only one available. He is so unhelpful that its better to be doing something else with my time, even if Ochem is the number one priority of my school life and tutoring is the only way i can learn efficiently. I understand there is a language barrier sometimes, but after spending 15 minutes explaining a question in a way that he can understand he almost always responds with I dont know. I ask what I assume to be basic ochem questions, but his responses always make me feel like I'm stupid for even pondering something so simple and abstract that nobody else has, and therefore has no answer to it. He gives wrong answers on homework, and not only does he respond to questions with the question you asked (ie; why does this bond form here in conjugated systems? A: because its a conjugated system) but it takes a long time to even get to that point. And forget about mechanisms. I never had a single one explained to me even when i asked explicitly, "can we go over this mechanism".

Sorry for the novel, but I hope it helps future students.

Those tutors and the book were what truly taught me The chemistry . they were patient and very positive

There were no Chem 345 tutors in Stephenson Down Under. The tutors would have been helpful because I live in Stephenson.

I actually received more helped from going to the CUE Sunday through Thursday. Everytime I went, there were only a handful of people there and therefore was very helpful. With that said however, I feel that the late hours contributes to the lack of attendance. For someone living in an apartment off campus, I feel it would be difficult and time-consuming to return to campus later in the day and this may be why there is never many people there. Perhaps an earlier time such as 5-7 may encourage more to come?

Tutors were amazing and helped in every way possible!

I used the tutors in Fulmer 401 for any question I had with the course. It was very helpful to have a tutor there throughout the day so I could drop in and ask questions as they arose. All tutors I encountered were very knowledgeable as well.

When I could get their attention, they were helpful at times.
I loved the tutors! They were so helpful and they knew there stuff!
Did not attend
Did not go to tutoring and mostly studied only own but can get a pretty good grade.
The availability of tutors was greatly appreciated. I wouldn't have made it though without them.
They were super helpful with anything I need whether it be homework or lab information.
I love the tutors!!!
good to have a place to go for help
I didn't visit the tutors but I heard they were exceptional
The TA's are extremely helpful!!!! I would not have the same understanding of ochem that I do if it had not been for the TAs. They each deserve Dr. Crouch's salary!
The TAs in the CUE helped so much!
Tutors were excellent in 401 but there were 1-2 hour gaps in time without them which was unfortunate
The tutors in Cue 502 were very helpful!
The TA's talked and answered questions as if I had the same chemistry education that they did, which made it kind of hard to interpret answers to my questions.
The study session in the Down Under moved to the CUE and I went ever sunday. This was an extremely helpful resource for understanding the class information. I even met other students there that shared majors and interests and we all formed a study group.
The TAs are great! They are all very friendly and are excellent at explaining the material. I've learned more from the TAs than I have ever learned from lecture.
Very awesome to have these TA's as resources daily!
Outside tutoring by the TA's was the only reason I learned anything in this class to the level that should be expected. Needless to say, having TA's available was an invaluable resource.
The help received outside of class was were I actually learned the material. I feel that Gregory Crouch makes an effort at teaching well, but ultimately doesn't do anything to try to get better at it. This is unacceptable since he is teaching at a college level. He should be a good teacher instead of leaving the teaching to be done by grad students.
This is nothing against the tutors, but I hardly used Fulmer 401 because it was so loud which made it impossible for me to focus, which was a bit frustrating since it was supposed to be a STUDY area... not social area. When I did go there many times I wish there was just one more tutor on staff for the hour because one tutor isn't enough for the amount of people needing help usually.
great TA's
Desiree, Ingrid, Ben, and most of the TAs were helpful.
Whenever I had questions about the course work my study group or the Facebook page was more beneficial than the tutors.
Fulmer is a great resource not only for printing but to get help on lab questions and homework questions and its open throughout the week. I did not use the CUE tutors.
My ta ben was great
Well, i wanted to live in Stephenson because of the chem tutoring, but they moved and made my living choice moot. So there is that
My TA Brian was super helpful and had good explanations to my questions.
The tutors were a huge help for me this semester whether it was for lab or help on the general class material.
I did not need the tutors, so I did not go, hence the "not applicable" responses.
Some TA are very very helpful and willing to help any student, however, some of them are not nice and not willing to help.
Tutor Austin Stanton in CUB 420 helped me in the course tremendously!
The tutors in the CUE were really helpful.
Tutors are very helpful. However, some TAs are simply not as helpful or cannot explain or provide genuine feedback the

way other TAs do.

I went to 401 at first, but the tutor there made me feel very incompetent and stressed me out. Did not want to go back.

The TAs in Fulmer were very helpful and and easy to get help from as well.

More lab time.

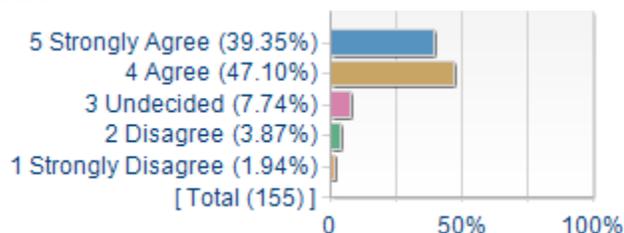
Thank you

The tutors were not welcoming, it seemed like it was hard to get help from them. I stood by the desk for long periods of time and the ta's would never ask if i needed help.

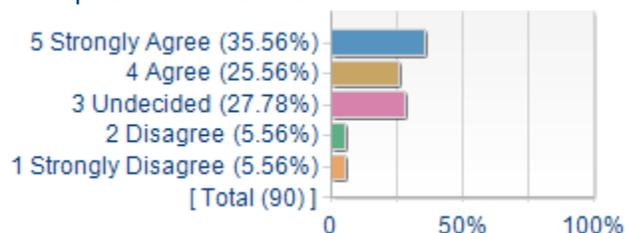
Please let us know about help you received outside of class in **CHEM 345.01-PULLM-3597 Organic Chemistry I:**

Competency Statistics	Value
Mean	3.99
Median	4.00
Mode	4
Standard Deviation	+/-1.00
Standard Error (base on SD)	+/-0.06
Population Standard Deviation	+/-1.00
Standard Error (base on PSD)	+/-0.06

1. The tutors in Fulmer 401 helped me in this course.



2. The tutors in Stephenson Down Under / Fulmer 401 helped me in this course.



Statistics	Value
Response Count	155
Mean	4.18
Median	4.00
Mode	4
Standard Deviation	+/-0.88
Population Standard Deviation	+/-0.88
Standard Error (base on SD)	+/-0.07
Standard Error (base on PSD)	+/-0.07

Statistics	Value
Response Count	90
Mean	3.80
Median	4.00
Mode	5
Standard Deviation	+/-1.15
Population Standard Deviation	+/-1.15
Standard Error (base on SD)	+/-0.12
Standard Error (base on PSD)	+/-0.12

We have introduced a lot of technology this term with the goal of helping you learn. Specifically, PowerPoint slides so you have the notes in advance of lecture and Learning Catalytics, so you we can assess how well you are getting the concepts so we can reinforce, if necessary, by additional examples. Please let us know what you think of the technology used in this class.

Comment
I thought that both the PowerPoints and learning catalytics were useful and extremely helpful
I think it's good but not so useful for me.
Learning Catalytics was very helpful, the power point slides were hard to follow outside of class, so I had to reference the book ALOT.
Learning Catalytics is a good idea but needs to be smoothed out a bit.
The technology was really helpful and unique.
Okay. Mastering chemistry sucks
I do not blame professor crouch but I never understand the material during lecture, I have to read the book. I liked that the notes were easily accessible online but hand written lecture notes would help me follow along. Because we used power point I could not take notes, went to fast. I really like learning catalytic though. I think it definitely helped me learn the material, I only wish we Did it more often and during the lecture instead of at the end or the beginning of class. Doing practice problem right when we learn it would help. (I know learning catalytic takes time to set up but there are other options to practice during lecture) . Over all I think technology very much aided in my learning.
I think both were very helpful. Without them I might have done worse in the class.
I liked the Lecture set up with the Powerpoint slides and the overhead used for extra examples. Learning Catalytics was kind of a pain because every time my phone would fall asleep it would log me out of LC. It was more helpful than Clickers but there is still some bugs to work out with the program
I really like the power point slides to use for referring back to when writing my mechanism/transformations and studying. I like learning catalytics as well.
When it was working, it was a very effective tool.
I found the Learning Catalytics very helpful in understanding the concepts they covered. Also, the ability to have the lecture slides online/ ahead of time was convenient especially if I needed to go back and refer to any certain slide
Learning catalytics is awful. So many questions wouldn't submit.
I liked the learning catalytics but it was difficult sometimes with malfunctions of the system and technology as far as receiving points
I did not like the learning catalytics but the powerpoints were nice
I disliked learning catalytics.
The technology was really confusing at first. Blackboard was good
I think the technology was beneficial to this class
I think everything was helpful, but would have liked to he his notes on the power points.
I like it
The technology is good but it would have helped to have more examples to understand. Having one example of each mechanism is pretty hard sometimes.
I liked learning catalytics.
Make learning catalytics work I showed up for every class and got credit for about 1/4 of the time and that needs to be fixed until further using learning catalytics
Learning catalytics was helpful in terms of learning concepts, but often times it would mark me wrong when I gave the correct answer or not give me points that I believe I earned so that was frustrating.
The technology used in class was fairly satisfactory. I was happy with Learning Catalytics as it's a great way to run examples in class. Mastering Chemistry, however, is the devil.
I like learning catalytics, because when Dr. Crouch writes questions for it he says they are like the exam and it's useful.

Loved the power points and I like the thought of learning catalytics, but the follow through or accuracy of the grading from learning catalytics wasn't good.

Poorly used. Power points were confusing

I liked it, but it needs some work

sometimes I lost points because when I submit my answers in learning catalytics questions, I do not receive points and it says that i did not answer the question. I do NOT know why it happened to me many times, maybe because of the internet access or LEARNING CATALYTICS is not helpful.

I enjoyed being able to get the lecture slides

I think at times, it was confusing just because it was new technology that I had to deal with. I didn't really like that i had to go to another site for my homework than having in included on the main website. Also, i didn't like the use of java.

I liked the power points. I took them home and studied them later. We should have filmed the class because sometimes I went home and didn't remember what the professor said.

I like that he uses Powerpoint lecture notes because then I do not have to write them down quickly in class, I can print them off and just add extra notes to each slide, which helps me listen to him more during lecture.

I like the use of the PowerPoint slides but I did not start printing them out until after the second exam. You should really encourage people to print them out instead of trying to write down all of the information. This way they can listen to what you are saying about the slide instead of trying to write down what is on the slide.

It's a good learning enhancer

I appreciated the slide. They were very clear, and it was nice to have them to look at while you were explaining them.

I did not like the powerpoint slides. I would prefer going through mechanisms and reactions on the projector. Also, we went through the slides too quickly and I rarely got enough time to write down the reactions.

I love when lecture slides are put up for students to print out and fallow along during class. often there is too much to write and not enough time to write it down during class if there are no lecture slides to print. with being able to print them out before class, i can fallow along durning class and add my own notes to what the professor already has.

Learning catalytics was an absolute nightmare because every time I logged in I was immediately booted. There were too many students in the hall. After midterms students dropped and this made my experience significantly better. I went to the cue several times to try and have them help and each time they were unsuccessful and claimed the hall was the problem why I wasn't able to stay consistently connected. It became very difficult to pay attention when being very upset with having to try to punch in my password and user name over and over again and wait for the slow connection to not even connect. I expect 20% or less for my grade from the learning catalytics portion. Lecture slides were amazing but I could get my money back I would.

The PowerPoint worked very well. The learning catalytics was good in class practice and discussion. However, it was very common for the system to record the wrong score when I know I did better. I think it would be the most beneficial to make it full credit for participation so that you are getting students to attend the class and the learning and profiting is up to the students themselves.

PowerPoint was helpful, it was a bit difficult getting the hang of learning catalytics, but after it was helpful.

Liked the learning catalytics but i think it should be used to help students understand more not necessarily quiz us right away on new material.

Learning catalytics was helpful

I like the powerpoints but I think that going through each reactions and mechanisms on the blackboard on the project with a pen would be better so we could have a better understanding of the steps (like math). Also more about rules that make reactions possible or not possible. I got lost in trying to solve the rules for each mechanisms more than anything.

Learning catalytics questions were well set up and definitely assisted in learning. However, I don't think we should be graded on getting the questions right because they were usually concepts we were just introduced to and shouldn't be held accountable for understanding yet. I also found the powerpoints to be helpful, particularly for being able to look back at them when studying.

I really liked having the powerpoint slides available, but I did not find that learning catalytics was helpful. The grading of it was very confusing, and I frequently had technology problems. My phone would occasionally sign me out of Learning Catalytics in the middle of a session, which gave me less time to come up with the correct answer. It would also often reset to the top of the page when I was attempting to scroll down. This made it too much of a video game to try and hit the right button fast enough before it reset to the top again.

I liked the questions on Learning Catalytics, however I hated the technology of it. It was really unreliable and picky.

I thought learning catalytics was much more effective than clicker questions! Also, having powerpoints helped, but it was hard to get all the notes hand written since he moved fast with the powerpoint.

The powerpoints were quite helpful though in class drawings were vital as supplement, not sure they are ready to stand on their own. When it functioned learning catalytics was actually quite nice, if bugs could be worked out it is a good option.

I found the technology used in this class to be very helpful. I think that without them, I would not have done as well in the course.

I liked being able to look back on powerpoints if I missed part of a slide in class or needed to refresh. I felt learning catalytics gave us good examples and usually stemmed into more questions which was also very helpful.

I like learning catalytics, but it was glitchy at times. I definitely think it should be kept but worked on.

There was a surprising a lot of technology used. I was a little overwhelmed at first, but after I got the hang of things, everything was fine.

Learning Catalytics was a good learning tool but the grading system for it was very frustrating.

I enjoyed learning catalytics because it made me realize what I needed to review from that chapter.

While I did appreciate having the lecture slides available to print out, I think that handwriting out the mechanisms we learned in class would be helpful. On the lecture slides the mechanism is all presented at once and makes it confusing to analyze the mechanism and follow along.

I was not a fan of learning catalytics, mostly because I had a hard time getting my phone/ computer to connect to the wireless. When the devices did work the information presented by learning catalytics was helpful.

The power point was only so helpful. I would prefer if the instructor did more examples on the board as he went through the slides.

Once it was figured out, it was helpful, but early issues were frustrating.

Very helpful

The powerpoints were extremely helpful. Learning Catalytics is also good practice during lecture to keep it from being too boring.

I really liked the new technology used in the course, I found it was very helpful.

I liked the PowerPoint style because I could easily open the different chapters to assist with the homework assignments. I never downloaded and read them before hand, but there wasn't a good likelihood many did. The learning catalytics was also pretty helpful. It was good to see examples based off of how the class responded to different questions.

I thought it was incredibly helpful

The PowerPoints and Learning Catalytics were helpful and had few technological mishaps.

It appears that there were many technological problems with L.C. however it was a great way of keeping the class active and incentivizing attendance in class

The technology change was excellent, I have no bad remarks on any of the newly instated technology. However, sometimes the learning catalytics would show up as a zero in the grade book despite me participating in class and getting answers right.

I like it. learning catalytics was helpful

The power point slides are what I expect from them, a visual to help us learn for the lecture speech. Learning Catalytics was actually pretty effective and interesting, it was just put into the grade book incredibly wrong.

I did not find the slides helpful. I understand that this was new to the course this semester, however, i was looking forward to him writing on the board and such as i heard he did the prior semester

I do not like Learning Catalytics. I lost a lot of points due to wifi problems and my phone being slow. Losing points for technology does not seem fair to me.

Learning Catalytics was okay. It was nice that we were not limited strictly to multiple choice questions like the clickers, but it was annoying having to bring my laptop to class every single day, especially when we did not do learning catalytics every day. If you told us ahead of time when you would assign learning catalytics it would have been more convenient for me because I do not have a smart phone.

I really enjoy Learning Catalytics, as I think it demonstrates who is in class as well as giving us a chance to think about the concepts just taught. My only complaint with Powerpoint versus a teacher who has to write the notes the students are taking, is that things tend to go really fast.

The technology used in this class was very helpful, the learning catalytics problems gave us the opportunity to do more hands on work and be engaged in discussion. More learning catalytics problems would be helpful for learning even if not for credit.

The lecture slides were great. Learning catalytics was the worst thing I have ever had to deal with. Every time I logged on it would log me out, and the question did not make any sense in the way they were asked. Strongly recommend eliminating this portion of the course. Also does not accurately add up points whether they are for participation or for actual points.

It was good. However, I was not a fan of the learning catalytics.

I liked all the technology!

PowerPoint slides were good. Learning Catalytics was a nightmare to use and stressful. It does not assess knowledge well when you know the right answer but the system does not accept your answer until after the teacher turns off submissions and you get it wrong. It would be hugely unfair to use the Learning Catalytics as a percentage of the student's overall grade due to numerous system malfunctions and misuse by the teacher, but using it in class with no right or wrong answer would help and make it less stressful in this regard.

Having the power points was handy, but they were not very informative. Learning Catalytics was a pain because of how long it takes and the many instances where it wouldn't work correctly or fast enough, or Crouch would disable submissions before my answer had finished submitting results in less points earned.

Learning catalytics was helpful in identifying areas of misunderstanding, though I'm glad they weren't frequent because I've found learning catalytics to be counterproductive in other classes. Slides were very helpful. The Facebook page was also very helpful.

I LOVED the technology used in class. The powerpoints were so useful in helping me direct my studies and learning catalytics was used perfect to help us understand stuff.. I do wish the learning catalytics points was based attendance/participation rather than based on correctness because sometimes the technology doesn't work for a question and also I feel like it's more of a tool to see where people are struggling for the teacher to know to go more in depth with an explanation not to act as quiz points.

having powerpoints was incredibly helpful in my learning of the materiel. Learning catalytics was a great tool for participation and I'm glad it wasn't graded on how many I got correct because of the variability in device sensitivity on touch screens.

Learning Catalytics was very helpful to reinforce recently learned concepts. Though the technological difficulties it had with the school network and inputs in the gradebook made it a bit frustrating.

very helpful

I can't stand Learning Catalytics. You need to tell us, for instance, when you are closing the question. There were many times I wanted to change my answer so I would click the *change answer* button which erases what I submitted and during this short amount of time you would close the question so I would have not submitted a response. At least give us a countdown or time limit. The powerpoint slides were absolutely not helpful. If anything they were overwhelming. Slides with just a bunch of molecules on them do not help in the slightest- this is the equivalent of a history teacher having a slide with paragraphs of text and expecting the students to retain that information.

I thought it was pretty helpful, but the learning catalytics did not give any explanation. Also it would be nice if I could look at the LC question while studying to see if i can recall them.

More helpful to go over things on the projector. Helps stay at a pace where it benefits the students to learn and also be able to write down the notes. The slides were very confusing.

PowerPoint were useful, but I was not the greatest fan of Learning catalytics. It would be better if it was based on participation and we discussed the answer in class.

I found it rather difficult to learn organic chemistry through power point however did like being able to access the material from home before and after the lecture.

Confusing to learn all the different websites, but helpful once I got the hang of it. I could never get mastering chemistry to work on my computer, had to use library computers all semester which was annoying

I thought that learning catalytics was a helpful program to have and having the powerpoint lecture slides online was useful when studying.

Having the slides posted ahead of time was extremely beneficial. If I was ahead of the notes and stayed on top of things, the class went smoother. Learning catalytics grading still confuses me, as we are supposed to get participation points but are still marked down according to angel--which I know is not correct but then what is correct? So syncing angel with learning catalytics would be best.

The Powerpoint slides were really helpful especially being able to refer to them outside of class and make flashcards of the reactions from the slides. Learning Catalytics was not my favorite because I felt it was rushed in class and we lost points for answers that were marked wrong but actually were right for a question. Also, this was the first time using LC so I feel everyone deserves 90 percent or above as a grade just for doing it.

I though the lecture slides were helpful both in class and out of class for studying. I though Learning Catalytics was also a very helpful tool so that we could see if we actually understood the material we were going over in class.

The Learning Catalytics was helpful, but the powerpoints are somewhat hard to follow.

i like that the PowerPoint slides are available. makes it easy when studying to go back and look at the slides for reference.

The power point to slides were VERY helpful and ,learning catalytic was good besides the interent connection difficulties

I enjoyed using powerpoints because I could use my laptop to write notes all over the slide. Also the writing was legible too.

I am very fond of the technology. It is superior to the former way of teaching.

PowerPoint slides are ineffective. I would rather have had written notes with the mechanisms hand drawn. Learning Catalytics was very effective. It helped prepare for homework and broke down the slides piece by piece. Made the PowerPoint slides more effective.

learning catalytics is good occasionally, but it is difficult to learn mechanisms with learning catalytics

The additional use of powerpoint and learning catalytics was helpful because it forced participation in the class and realizing what concepts we understood

Although learning catalytics had some problems throughout the semester, it was very helpful in being able to understand and discuss topics.

learning catalytics was a mess

I thought the power points put up in advance were helpful. I'd look at the slides the night before the class. Learning catalytics was a hit or miss. Sometimes I'd answer all the questions right and it'd say I had some wrong. Or it would say I hadn't answered any of the questions. It did help me understand some concepts though.

I really like the technology that was used in class. It was very helpful that the slides were posted before the lecture and I really liked the learning catalytic's opposed to clickers. They were also a nice refresher to see if I was understanding the material.

Slides posted did not do much for me as I strongly prefer handwriting all notes for the associated cognitive benefits (rather than printing the notes). Sometimes slides were skipped before I was done writing, so that I guess would be a benefit. Learning catalytics was nice, but a bit stressful due to connection issues.

The Power Points were definitely helpful. I referenced them a lot when studying and doing homework. I think that Learning Catalytics was helpful in class as well to test our knowledge of the concepts. My only problem with it was that there was still bugs on accessing it in the class at times and that I kept getting notices that my Learning Catalytics grades were late. If the software issues for it are fixed I think that it is a really good thing for the class.

ppt is good for study.

good

Technology definitely gave an advantage and was useful.

Learning catalytics did not serve to help my learning at all, they were simply a waste of time. Between taking awhile to setup and wasting precious class time (especially for a course of this caliber) they only hindered my learning, especially with the pressure of being graded on how well you perform. Both classes that learning catalytics were used in only served to make my learning harder. The powerpoints used in this course, while useful for easy information, they generally had too much information to succesfully copy to a notebook, while still listening to what the instructor was lecturing on regarding this material.

Power points are awesome and well made. The learning catalytics software isn't , it is helpful to go over the information but the software itself is buggy, for example if you enter an answer but immediately change it to what you know is the correct answer you will not get points for the question because you entered the incorrect answer first. This happens before the answer is displayed on the screen.

Learning catalytics was a failure. It almost never worked on my mobile device for various reasons and sometimes wouldn't even work on my laptop.

Great methods in helping us further on the material!

The technology was a waste of time. We spent more time arguing and trying to figure out learning catalytic which delayed our learning and took away time for questions. Overall I did not like all the extra technology.

I really liked it. I liked that it got the students more involved during lecture, and that it was participation so as long as you were trying you got credit and could find out what you needed to work on with out getting penalized. I'm glad both the PowerPoint slides and learning catalytic were involved in this course especially because it was so challenging.

Having the Powerpoints was really helpful, because the tests given were based off the slides so it helped show what we should have studied for.

It was easily accesable, and helpful.

Posted lecture slides were useful since the class was so fast paced. If you tried to take notes during class then it was impossible to keep up. Blackboard was okay once the kinks were worked out. Pearson homework was HORRIBLE HORRIBLE HORRIBLE. The school should not be using a program that is so difficult to work on regular at home computers. The only computers that I could find that worked was in the science library...NOT EVEN THE COMPUTERS IN FULMER 401 worked.

I found having access to the Power Point slides used in class both before and after class to be very helpful because the material learned in class is difficult to take notes on if we have to write down everything that is presented to us.

I thought Learning Catalytics was helpful. The lecture slides were helpful for studying.

The various technologies, aside from a few glitches, worked fine.

It was great, but confusing

I enjoy the initiative taken by learning catalytics to encourage students involvement. I wish we had more sessions, not for more credit, but so I could have better understood the content instead of waiting until later to look at the slides again.

Learning catalytics was more often unhelpful than helpful, and tech problems often obscured it's use.

I liked the learning catalytic's but the premade slides were obvious, especially when my instructor had a difficult time using the slides at times.

I like the power point slides much better! Learning Catalytics also helps, but it sucks dragging your laptop to school just for 15 minutes of use for one class. (I don't have a smart phone or any other mobile device.)

It was Helpful

PowerPoint isn't new technology.

I liked learning catalytics.

Powerpoints are a waste of time. Test like exams would be more helpful as well as more time for students to ask questions.

I liked it. I like it better when Crouch does the reaction/mechanism on the board or over head because can see each step, rather than seeing each step in one big picture.

Learning Catalytics was somewhat helpful. I did enjoy the use of PowerPoint slides.

I liked it, it would be helpful if you would annotate the online slides with additional information.

I loved the new technology. It made the class more engaging, and aided in clarifying concepts. The only thing is, the room used (Fulmer 226) did not have enough internet access for all the devices in the room, despite adding a lot since last semester.

Definitely helped a lot, but keep working on it. maybe have questions at the beginning of every class about what students should have read and studied the night before in preparation for the current class.

I like the availability of lecture slides to be able to review lessons for studying. I enjoy using Learning Catalytics as a way of studying and reviewing. I would like to see learning Catalytics used more during lecture to keep students engaged and put the material we just learned into a format similar to testing to help us learn and prepare for exams.

Everything was so helpful to students

It worked well. Having the power points to review was useful. Dr. Grouch used the overhead for extra examples as needed which was helpful.

I found LC especially helpful in understanding and reinforcing the concepts being taught in class

I think the technology used was very helpful in this class.

Learning catalytics is beneficial but minimal points should be awarded as to not deduct from students who missed class. Also more time is needed when submitting learning catalytics because sometimes I would be in class and wouldn't submit because i was trying to figure the question out still.

The power points were more helpful than during spring semester when it was all done on the chalkboard. It keeps Dr. Crouch's focus a lot better.

Power points had too much information on them, but were useful online. In lecture, hand notes would be better.

The technology was very helpful.

The learning Catalytics was a nice touch to this class

Slides were great for review, but so much info was hard to process in lecture. LC was nice when it worked. Text book was useless

No opinion

the power points were awesome, although the learning catalytics were hell if you had a device that stared up slowly or had internet connectivity problems. I missed a good portion of the problems because of that. consider giving the questions more time, or using a different system. I liked the theory of learning catalytics, my laptop just sucked. And the integrity lectures never got put up, i was depending on those for the first exam and missed recording the lectures on my own under the assumption that they were all going to be up later

Too much tech, was frustrating to deal with. Please go back to how it was 10 years ago when we used to write on paper

Learning Catalytics helped to identify what types of questions would be used for the exam and also for me to evaluate what I needed to brush up on. I liked that it wasn't annoying like a clicker and it was definitely an incentive to come to class.

The powerpoint was a good visual aid, but going back to review for the test, they were sometimes confusing to understand

The PowerPoint slides were very helpful. Learning catalytics was unreliable because there were frequent problems with WiFi connectivity.

I do not have additional examples

It was fine. But looking at all the lecture slides on Blackboard, I wish they were labeled as what they contained. (For example, Chapter 16- carboxylic acids and derivatives)

Most teachers provide slides. Learning Catalytics was sometimes useful. I feel like there is potential with the program.

PowerPoint would have been more useful with the voice recording of Dr Crouch. My genetics professor records her lectures and I find it very valuable for review rather than just the visual aid.

PowerPoint's did not help me. You went too quick on the slides, thus I never fully got the explanation even though I looked at them ahead of them. I'm someone who needs to be shown examples from beginning to end, not just some images of problems since images without good explanation on why things happened caused me to become confused.

Learning Catalytics....most of the time I couldn't get connection down in the pit....thus it shows poor participation when I was there.

The powerpoint slides were very helpful but the learning catalytics did not seem to help much. It was always very confusion and not explained very well.

I valued the PowerPoint slides as I was able to refer back to them while I did homework. Learning catalytics were helpful in understanding concepts but there was a problem with the transfer of points from learning catalytics to mastering chemistry to blackboard. Next year, if the transfer of points can be accomplished more smoothly, learning catalytics will be very useful and helpful.

I think that the thought was there, but Learning Catalytics mostly hindered learning due to technical difficulties. The POWERPOINT slides were useful.

I think it was interesting and new!

The PowerPoint slides were very helpful

The lecture slides were great, easy to find and download outside of the class room. But Learning Catalytics did not transfer over well to the grade books, and has myself and many other students concerned about a negative impact it may have on the semester grades. They are a great tool to use during lecture to help us test our progress and knowledge, but they should not be based on credit for answers, rather just on participation.

I like the powerpoint for looking back at lecture slides because the material is covered very fast during lecture and taking notes would have taken away from mentally processing the material and learning during lecture. If everything would have just been on the overhead or board I would have been trying to scribble it all down fast enough instead of being engaged and thinking about what was happening.

Learning catalytics was extremely helpful, it was an immediate judge of my knowledge and if I was following the lecture.

If I got a question wrong I could just write down to review that idea.

The facebook group was amazing for help on homework or general ideas. Without the group you would have to wait to get answers until the next day when you could speak with a TA, this would break up learning and be counterproductive.

I did not benefit from learning catalytics.

Power point was new to me for a chemistry class but i found it helpful for this class.

I liked the power points because it made it easier to review after class. Learning catalytics was ok. The grades in the grade book for it were often wrong or confusing and there was a lot of technical problems.

I like it.

The technology was a lot of help.

The power points were not always helpful because Crouch would often need to show us how a reaction happened and not just that it happened.

I liked Learning Catalytics and the homework a lot, but I think learning catalytics shouldn't be used as attendance -- you should get extra credit if done, but because of unpredictable times, you could miss one day of lecture and get 0 points, which isn't fair.

learning catalytics was helpful

While we know Java errors caused some difficulty with the online homework, the goal was to move some credit outside of tests. Homework (drop lowest 2) is worth about 10% of your grade. Please let us know what you think of online homework.

Comment

I thought it was helpful to get the practice for the exams. I also thought it would be helpful to have the answers to some of the book questions for more practice as well.

Online homework is good, and it's a good way to enhance the knowledge I've learned from the lecture. Except for some errors, it's good overall.

The online homework was kind of easy to follow along, I understood the material then but was challenged during the exams.

I don't know if I'm qualified to have an opinion about it because I didn't bother with some of it.

The homework was helpful to understand certain concepts and work with others.

Stupid. The mastering chemistry site does not work and is incredibly frustrating to use.

I liked the online homework. I wish the exams reflected the homework more. Even though I was having some difficulty at the beginning with Java, not using the right browser, or accessing mastering chemistry through blackboard, I got the hang of it. After the kinks were worked out doing homework was fine.

I think getting points for homework is good initiative to actually do the homework. However it was pretty challenging.

Mastering Chemistry was fairly difficult to work with. First, I have a Mac so in order to use the drop down tools like the "Add Group" or the " Select specific molecules" I had to use Mozilla Firefox instead of Safari. Also the right clicking function did not work with either one, I tried using a PC mouse connected to my Mac and it still did not work. Mastering Chemistry also offered little to no help if you answered the problem wrong. It is very hard to determine what went wrong without a hint. The molecule making tool was much better than the one used in General Chemistry so that is one plus for Mastering. Overall, it was a decent program it could be improved by making it more accessible for Mac Users and by adding hints on the more difficult problems.

I like the online homework but sometimes the grading policy on it seems unfair, such as answering a question wrong 1 time and getting 50% taken off in some cases. Having the facebook page and tutors definitely helps a lot with it, but it still can be somewhat confusing at times.

Forced me to study, it probably helped me do better in the course.

I like Mastering Chemistry, just not the Java updates. I believe the scoring was fair and it was an easy system to use HW was fine and fair, keep.

I liked the online homework. It was challenging sometimes but it helped me study.

I liked the homework. I like that we got multiple chances to answer questions and that the questions were based solely off the textbook. I would make homework worth more points.

It was very effective.
It took a great deal of time. Almost too much but it was helpful
This was helpful to learning material
The online homework was hard but doable.
I liked it for more points
Some of the work I felt was near impossible to find out when we just learned the material. Most of it was good.
Good!
It helped a lot
I like the online homework although sometimes drawing the molecules was a bit difficult.
It's terrible, but I appreciate the fact you've moved some of the credit outside of tests.
Most of it was pretty easy, but some questions were difficult and help was needed on them.
I liked the online chemistry homework and the Facebook page was very helpful when I was stuck on a question.
much prefer writing the questions down and working through with tutor. Too many technological errors even with input.
I've previously had chemistry classes that used mastering chemistry, and something that really helped me was that they provided actual hints that were helpful, unlike on this course where there were never any hints and the slides couldn't help you and if there were hints it just emphasized the question, which wasn't any help and didn't help me understand it.
they are helpful, but most students lose points because Java errors even they know the answer of the questions.
Online homework was very helpful
I think it helped, but the java was really what made me miss a lot of the homework because I had to constantly update it.
I thought it was ok. I got help on them.
Some of the homeworks were really hard. But I found that I only did really bad on them when I waited until the last minute to complete them.
Java is really annoying, and I would have to restart my computer a lot to get the homework problem to work. But I thought the homework was beneficial to my learning.
Good learning enhancer. More problems with feedback would help more
It was a valuable learning tool, as we were required to practice the material.
The homework helped learn the material, but I wish there were hints with the homework.
homework is a good way to get more points in the class and for that i am glad we had homework. the course material was hard so towards the end the homework got harder and needed more time to complete. i think the homework should have more hints while you are trying to figure it out and i think once you have tried as many times as you can i think it should show all the work on how to get the right answer; this way even if we dont get the point for the question we can still learn from it.
I really would have liked to see remedial problems integrated into the homework from previous chapters to help reinforce our knowledge of the subject material. This would have been very beneficial provided at the top of the question it did indeed claim it was from a previous chapter as to not have us beat our skulls against a wall trying to force new material to work. All in all it was good, but I guess with chemistry, there will be problems that are just impossible.
The online homework was typically helpful and good at preparation.
The homework was difficult at times since it is very specific. Also for some reason it wouldn't run properly on chrome
Was difficult but not too difficult
The grAging was messed up a bit. There was a homework of 14pts , I recieved 100%, 97% on most all questions but the last one was a multiple choice question with two options that I chose wrong and somehow got an 88% on the hw overall. This was a common thing with all homeworks.
The homework was helpful. I'd like at least one of two additional problems with hints (or help steps) to get a better understanding of what I've done wrong. Or for each problem to have a comment about why its correct to gain more understanding. I hated JAVA, about every other homework problem i almost always had to restart my computer to get java to reload.
I found the online homework to be extremely helpful. It was not too hard, so it was not a time burden, but covered the material well and made me learn the material and have feedback each chapter instead of waiting until right before the

test.

Homework helped but was difficult at times with mastering not accepting answers that would have been accepted on an exam.

The online homework is difficult at times. I don't like that we get docked points every time we answer a question wrong.

I am so glad we had homework. Some of the assignments took a long time, but it really helped reinforce the course material and provided more study material for the exams. I also am very grateful that it is 10% of my grade- it is much easier to get points here than it is on the exams.

I loved the online homework! It helped a lot and I didn't have any problems with Java.

The online homework was extensive, I thought it was a bit much for weekly assignments.

The online homework could use a little work, its demands and range of acceptance were slightly unreasonable in my opinion and it didnt provide feedback as much as I would have liked. I think the written homework as in 348 is very nice, but i undertsnad that is harder to grade with large numbers of students.

I thought that the online homework was very helpful. It allowed me to reinforce the concepts learned in class and to identify areas in which I needed to improve.

Occasionally the questions would be very strange or hard to do based on lectures, but a majority of it was reasonable and somewhat challenging.

For the most part it was good. There were a few glitches that caused me to miss points on my homework but it was never too significant.

The online homework was very helpful. For the most part, it worked when I needed it to, but I hate Java. It is the worst.

I think the homework should have been participation based not actually graded on correctness.

1. I had no idea that the lowest 2 hw grades were going to be dropped. Not complaining about it though.
2. It was a little frustrating to get the hw to load in the beginning due to java, but once I started using a compatible web browser (google chrome) then I didn't have too many technical problems. Of the content itself, I think the homework was fair. Some of the problems were difficult, but with the help and availability of the hardworking TAs, I never had an excuse to leave a problem unsolved due to its difficulty.

I think the online homework is very helpful and I am glad that we had points coming from somewhere else.

Adequate for the most part. A god way to check if you were taking effective notes/understanding lecture. Sometimes I wish that more of the problems provided feedback when you got it incorrect.

Very helpful

It is very helpful

The online homework was very useful for making sure I consistently studied.

Well.. now knowing it is only 10 percent of our grade, it was a lot of work. Yes, errors were a pain but it also was good to be semi-forced into spending a couple more hours a week working on the concepts. Homework definitely did help though and was a comfort to have some sort of a buffer. I'm hoping to see something sort of similar going into 348.

Really helpful and affective

Technology issues caused a lot of problems, but the homework itself was reasonable. I preferred when the problems gave hints/feedback on incorrect answers so that I wouldn't waste all my tries approaching them from the wrong angle.

Very helpful in understanding class concepts however, there were many technological niches which cost points

Excellent, I really like the way the grading was set up as well as the way the online homework was formatted.

I liked it. helped review for test

I loved the online homework and had no errors with java but I have seen others who have and it is a painful piece of garbage to work with when java gets in the way.

I am personally not a fan of the online homework because the level of frustrating outweighs the learning value of it

The homework is fairly helpful, no complaints, but it wasn't exceptional either.

Mastering chemistry was terrible. I usually learn most class material from homework assignments and then rely on lectures to clarify problems. Mastering chemistry did not teach me anything. It rarely offered any useful feedback to why I was getting problems wrong and I felt like it was only there to siphon even more points from my grade (as if the exams weren't hard enough). I transferred here from the University of Washington Tacoma campus, and my chemistry classes there used a program called ALEKS for online the homework. It's an adaptive program that assigns problems based on what questions you miss on assessments, and has you redo problems until you can consistently get them right. While

it was a pain just trying to finish the assignments on ALEKS because they were lengthy and repetitious, it had incredibly helpful tutorials to walk me through the problems. Furthermore it ingrained the correct answers in to my brain through repetition, so I found it to be an invaluable study source. And while the grading on it was only on a completion basis, the assignments were lengthy enough that finishing them was actually a challenge, so not everybody got 100% on the homework. Even so, ALEKS was a grade booster because it could only add points to our grades, and it forced us to learn the material so we did significantly better on the exams. ALEKS was a much better online homework program than Mastering. Mastering chemistry was just frustrating.

Online homework was challenging, always taking me multiple hours, but I found it really helpful in understanding the subject. The only thing that I would like is more of the hint/walk-through options that can come with some of those problems.

The online homework was at a good level of difficulty and did give us that extra opportunity for points and learning.

The online home work seemed to help, but I feel some of the assignments were too long. Also each assignment took at least 3 hours, some took more.

It was fine, Java was very slow on my computer though, which made the homework take longer than it should have.

I loved the online homework because it allowed us to practice the concepts learned in class. However, due to the difficulty of this class, it would have been nice if we didn't lose points when short answer/structure drawing questions were asked because these problems are very difficult and it was stressful to be focusing on not losing points instead of just practicing/learning the concept. Multiple choice questions should have penalties for wrong answers to prevent guessing, but short answer ones should not.

The homework helped, but it should be graded in a manner to where you do not get marked down after a single mistake. I think if students take the time to do the work, they should get the full credit associated with the homework and then only have to stress about the tests. It would make the whole class less stressful.

It was good. It helped me learn relatively well, but some questions were not clear all the time on what they expected from an answer. This sometimes caused stupid errors that resulted in lost points even though the concept might have been correct.

It was very fun being able to "draw" the compounds with Java. The best part about the homework was it gave hints if you made a mistake, so at least I would know why I was wrong.

I LOVED IT!!! And most students I asked did too, it really helped solidify the chapter in your mind as your were studying it.

The homework was generally helpful but the specific formats of correct answers sometimes led me to losing credit even though I understood the reaction.

I had only one error with Java and it was resolved almost immediately. The online homework was a great was to improve understanding and practice material.

very challenging

The online homework was OK as far as difficulty and helping with concepts but the Java issues made it VERY FRUSTRATING. I would routinely have to change my browser to get Java/MasteringChemistry to work. There was a time when I had a problem open for 4 hours for it to load and it never did. This is running on a brand new laptop on the school's wifi.

It was very helpful, even though some were extremely hard and not covered on any of the tests at all.

When the answer was incorrect, most of the time it didn't give a reason why it was wrong. It would help if they gave hints on how to arrive at the right answer.

It is useful in terms of accessibility, but it was annoying when it would not accept your answer based on one technicality, such as not including a hydrogen on your response, or ions in solution.

For me the program was very frustrating. I like knowing what is wrong with the problem so that i can see and fix it. Continuously guessing at my mistake wasted points and my time.

Even after going to the tech store multiple times, I couldn't get mastering chemistry to work on my computer, had to use library all semester, but the assignments themselves were very helpful in learning the material

The online homework was challenging at times, but overall was helpful to the course because it forced me to do problems relating to new material and it encouraged me to go to tutoring with the T.A.'s at least one time every week, usually multiple.

It is good to have homework, however I found that I did not do it every week between other things in the course and other classes. Had I done the homework more diligently I probably would have done better in the course.

The online homework was more difficult than it should be due to the questions being not clear on what products they

want drawn. The questions were harder than in class which probably helped us learn the reactions better but I feel they should take less of our time.

I thought that the homework was fair. Some of it was difficult and other parts were easy. My only suggestion for the homework would be to add more attempts, sometimes on the harder questions you could get close, but lose all credit because you didn't have a couple more attempts.

It was helpful, but there was too much of it. It was tedious doing it.

Homework was very helpful!

the online homework was good, the only problem was the java errors.

Very helpful good software program

Online homework definitely helped me understand a lot of concepts. If there was not homework, I would never be able to study independently.

I find the online homework helpful. It is a bit annoying but it really reinforces the concepts.

The homework should have reflected all of the material on the exams and the way in which we were tested. As it was, the homework focused mostly on synthesis, which was a jump from the important preliminary functional group transformations.

the onling homeowork was very unhelpful this semester

The use of the homework itself was helpful, because it again forced participation in the class as well as an understanding of concepts we don't know as well. ALthought, it would be a right sight better if a different system than java was used. that sucked bad.

Java is terrible. But the online homework does help a lot.

java messes up a lot. some times it would only work for 1 question, i would have to log out and re log in to answer another question. and do this for each of the 20 questions.

Online homework was good practice. Some of the questions were a little finicky (because I use a Mac computer) but overall it was helpful.

I also thought the online homework was beneficial in my learning of the concepts. It also was nice to know what the professor thought were key concepts that were emphasized in the homework. I also think it was a great idea to move some of the points out from tests.

Mastering Chem was excellent! I took the course in the summer, receiving a D. This time around, I expect an A. Coincidence? I think not (Well maybe some carryover effects from prior learning, but I think having homework for practice helped a lot, too)!

I liked the homework. I always did fairly well on them. They are great for solidifying the concepts. I would enjoy seeing a review HW for the final. Not something that is worth any points but as something we can use when studying for the final.

online homework cost too much and not really helpful/

I don't like Java. A lot of times, I draw correct answers but Java didn't realize just gave me wrong wrong wrong.... I think this person online hw program is supposed to be changed!!!

Sometimes the questions were not very direct or clear and it took all attempts to find out something like it wanted hydrogens explicitly labeled even though it was not clarified type stuff.

The idea behind taking some value away from the exams was a good one, the homework required far too many hours than what is necessary to get the point of the information.

Online homework was good when java was behaving.

It worked well!

Homework was very helpful in assuring our ability to do problems that were discussed in the lecture! Yes the java errors and the inability to open or recover was very troubling, but since it was not worth much in the class, it is only beneficial to do.

I liked the homework, but it did not translate very well into test question, at least as far as I could tell. Also the online homework only worked half the time which hurt my grade.

Helpful. It is nice to have a small cushion that is homework to help your grade if you are not a stellar test taker. Plus, it gets you to study; with points involved it helps to motivate. Even if it's only 10 of your grade.

The helpful was an effective tool to have when it came to study, and study the different levels of a specific section.

Homework helped alot in applying what was learned in lecutere.However, online homework would be much more

helpful if there was feedback to every problem.

Pearson homework was HORRIBLE HORRIBLE HORRIBLE. The school should not be using a program that is so difficult to work on regular at home computers. The only computers that I could find that worked was in the science library...NOT EVEN THE COMPUTERS IN FULMER 401 worked. Significant drop to my grade.

I found that the homework was helpful in understanding how to apply concepts learned in class. I believe it would be more beneficial to keep the online homework and work out any technical bugs.

I thought it was helpful in learning the material and it encouraged me to go to tutoring sessions.

The homework was usually good, but it was tough getting feedback on exactly what you were doing wrong on some problems.

It was hard at the end.

Online homework was very good for practice in terms of what we learned in class. Sometimes it would be frustrating in terms of its feedback, eg, little to no feedback and some questions became nigh impossible without TA assistance.

The homework was challenging but helpful

I strongly dislike online homework for a chemistry class.

Homework was really difficult. The biggest problem is that when you get an answer wrong, you don't know WHY you got it wrong. Mastering doesn't really help in that regard. People on the facebook group were also somewhat cryptic in saying why the answer was wrong. I just want a straightforward answer.

The online homework could be frustrating

I actually learned the most from the homework, mostly through trial and error.

Homework programs are horrible.

They do not test a students real ability to understand the material. They do not give partial credit and there is no real feedback as to why we are wrong.

Very helpful! Don't gif rid of it.

Homework was frustrating at some points, I would like more feedback if I got a problem incorrect to help me understand how to complete the problem.

It was sometimes unclear what they wanted from the homework exactly

I liked the homework, they went over important and relevant topics/concepts. Additionally, they were not super long, which is usually a problem in chemistry classes. I didn't have issues with the homework not working this semester, but I know of people who did.

Best thing ever. helped with understanding and helped my grade because I can show my understanding without having to rely solely on exams.

I think the online homework is good, but I would like to see additional optional work problems added to give students more practice, especially before tests. Also, the homework problems and the tests problems are very different, so the homework alone will not suffice to prepare students for the exams

That was good too

It was frustrating. Online chemistry homework just takes more time messing around with the technology than the concepts.

Mastering is helpful, although some of the answers are very specific, even if you are technically right it will mark you wrong

Very beneficial but time consuming. It would be nice if no homework was due on weeks of break or near finals.

The program made it more difficult than it was worth. It seemed as though the lab percentage was lowered rather than the test percentage. If the homework percentage came out of the tests it would have been worth it but overall it ultimately harmed my grade as I did better on the tests. I was also less willing to try to figure it out rather than immediately ask because of the limited number of attempts (especially since it was easy to forget a charge or something). This hurt my learning because I learn better when I experiment with the problems rather than immediately seek out the answer.

I liked the online homework, but would like it to correlate more to the exams.

I think that online homework was very helpful. The bugs need to get worked out but overall it's a thing.

The online homework was good. It was challenging

Much appreciated, because my test scores sucked. I did all the study techniques suggested, and spent an amplitude of time, but some things are just rough.

The homework was normally helpful but some questions didn't seem to be covered in lecture and made them very difficult.

Please, continue having homework. With the proper resources (study groups, TA's, etc) this helped both my understanding and my grade. Although, please only assign homework when tutoring will be available. I'm referring to the fall break fiasco. That wasn't cool. At least post it while the tutors are still having hours in the week previous. Otherwise, it was awesome.

Homework was good, would prefer more practice problems

Java sucks. It froze and would boot me out, but minus the bugs the homework was helpful in reinforcing material in class and forcing me to spend more time with the textbook.

Its helpful, but impossible to do without the help of tutors. It needs more helpful tips as to why you got it wrong.

The online homework was a beneficial learning tool

It was helpful for me

Some of the homeworks were difficult. I wish that if the student pressed "Give Up" that a message bubble would appear explaining how the problem could be solved. This would have helped me better understand the material. This message bubble could also appear after the student got the question right to ensure that the student knows how to solve the problem and that they had solved the problem correctly.

The homework was well put together most of the time.

It helped to solidify what we learned in class each week. I found it very helpful.

The online homework wasn't very representative of my knowledge since I would miss points for typing the correct name but in different formatting. The questions were also worded somewhat poorly. I also wish there was more feedback available when I got questions wrong. Feedback problems were hugely beneficial for both my grade and my understanding and I worked those problems out rather than looking for a solution on the facebook page.

I had major problems....sometimes it wouldn't load thus 3 home works were not completely finished because of it.

The online homework would have been more helpful if it pertained more to things we actually encountered on the tests or in class. Sometimes sections on the syllabus that were marked as not being covered had homework questions about the sections and the topic had not been covered in class either.

I loved the online homework and was glad to have additional points in the grade book. The online homework may or may not have been concepts on the exams but I was thankful for the additional points and it forced me to work on chemistry for longer.

Online homework was not worth it. Most of the time the Java plugin wouldn't work or was out of date. Also I do not believe the lectures aligned with the homework very well.

I think the online hw is great. It reinforces concepts and I like that it gives us something else to supplement our overall grade.

I thought the homework was very difficult and frustrating and did not help me learn the material.

I think the online homework was a success this year. I liked it, and I know my friends liked it. It is easy to take with you and pick up and put down for 30 minutes at a time, and allows us to draw molecules and mechanisms with feedback and the ability to see our previous mistakes.

I thought the homework was extremely helpful in learning the material. The homework basically just counted as study time for me as I would work through the homework throughout the week and know what concepts I was unclear of when they came up in lecture. It worked well and I had a lot of eureka moments in lecture when a concept I was struggling with on homework would come up. I think having homework is an excellent idea because it gave me immediate feedback on how well I understood the material.

For the amount of time I put into it, it should be worth more of my grade.

Online homework was very helpful and covered materials from the chapters.

I liked the homework. It helped enforce some ideas and forced me to review things better. It sometimes caused my computer to freeze though.

It should be worth more.

Mastering Chemistry was hard to use especially when trying to get the arrows designated to the right place.

Mastering was extremely helpful, especially when the homework would give feedback

I appreciated the online homework. It provided immediate feedback that showed if you got a concept or not. More support for the homework would be nice though -- additional examples and such for practice.

Helped with my understanding of the material

What addition innovations would help in this difficult class. Before answering this, please remember that the course content (amount of material covered as well as tests) is not variable. We are looking for suggestions on how we can help you succeed given the parameters of organic chemistry.

Comment

As i said above, having answers to the book problems would allow us to have more practice before exams.

First, I think the teaching methods should be improved. I know self-studying is important, but if without efficient help from teachers, the learning result can be bad. Second, I think the teaching should be systematic and the rxn page should be innovated to a rxn page with specific examples but not only words, sometimes examples are much better than words. Third, the teacher may need to communicate with students often but not just teaching the required materials.

Not sure. But I should've tried harder than I did. So again, I'm not qualified to have an opinion about it.

A better homework site.

I think more practice problems that reflect what we will actually see on the exams would help. The practice tests Did not help much because the course has changed.

TA hosted reviews for tests would be very helpful. The reviews in class are moderately helpful but since there are many people in class it is hard for students to ask specific questions.

-

Possibly recording lectures so that if someone misses something the professors says in lecture then they can go back and listen to it

Link khan videos relevant to course on course website

For exam 1, introducing the largest concepts more than a week before the test. I felt like too much time was spent on exam 1 material that was not on the exam much. The mechanisms were not introduced until the week before and they were very challenging at the time and a large part of the exam

It would help to have a list of the reactions with all of the possible solvents.

A straight list of examples of mechanisms.

Extra credit practice online

Posted TA office hours. More practice questions on mastering chem and ways of doing it.

Everything said above.

Do more problems in the hw and in class that are similar to exam questions

Sometimes it is hard to understand just from reading the text, going to class is helpful but having more video resources would also be useful. Even having video recordings of lecture would be useful because we go over so much information in class and it is hard to keep up with taking notes, being able to reference things said and examples gone over in lecture would be very useful.

More examples, more examples, more examples.

I think the course is doing absolutely everything to help students succeed.

dont just read lecture slides. I can do that. Utilize the projectors in drawing my step by step mechanisms

provide actual helpful hints on mastering chemistry

I think that using flashcards is a big help.

Have videos of the lecture.

I would benefit from alternate perspectives as to how to comprehend all the information.

N/a

Provide hints on the homework and either go slower through the slides or use the projector to go through mechanisms and reactions.

i would have done much better on exams if they were formatted more like the learning catalitics questions. the word

problems were hard on the exams because it is hard to know where to start. if there is more structure to the questions then they will be easier to understand.

Remove learning catalytics. My grade at least took a massive hit because of this... Aside from that quizzes on the following Monday set after new material has been taught would be beneficial. Also requiring all students to know the pka chart within two weeks would be greatly important. Responsibility isn't hard and sure the course is set to weed students who don't really want the degree, but for the sake of teaching chemistry having an exam explicitly on this would be important set at the beginning of the semester.

Possibly an optional worksheet per chapter.

What would have been the most helpful to me was a textbook that has answers to practice problem so when I'm studying or practices the problem in the book i can check my answers. i started doing problems out of the book during the first chapters but gave up after two weeks before I never know if i was doing problem correctly or not because there are no answer in our chemistry text book. I'm was not about to spend another \$200 on just the solutions book, that \$200 in food and it wouldn't have helped me solve and learn from the homework because I would have just used it to do the homework online for a good grade.

- A session on how to use your model kit. Mine was so strange, I wasn't sure how to properly use it to make chair conformations or what else I even needed it for.
- Add a couple of review questions from previous chapters to the homework to keep it fresh
- On the reactions page, I thought it would have been helpful if the chapter was listed with the reaction so that it could be more easily found. Some of the mechanisms are really similar, so I wasn't always sure what chapter or mechanism it was referring to. Especially since the mechanism names did not always match.

It would be nice to have time to slow down and walk through mechanisms in class on the board rather than a PowerPoint.

I think it should be required to meet with the TA outside of class.

Although this was changed for powerpoints i think the order of material could still be altered, it was done rather well this time around but the whole 6 mechanisms on the first test 20 something on the second and a jump of 30 new ones prior to the final isnt the most ideal.

Dr. Crouch mentioned how learning catalytics is capable of mapping the distribution of right and wrong answers in the classroom allowing those who don't get it to connect with those who do, yet he never implemented it. If he had, or if he does in the future, I believe this would help.

Provide links or diagrams of template mechanisms. Sometimes it can be hard to find ones that make sense given the information on the excel sheet.

Maybe providing lessons to students on how to use their model kits. I personally never used it and did not need to but I have other friends in this course who needed to use them but did not know how and could not figure it out on their own.

I really do not have any suggestions. I think plenty of help was offered, the material asked on the exam seemed appropriate to me. However, i guess i missed some questions based on clarity. I knew and understood the concepts, but at times I thought the questions were asking something else.

I would put a little more pressure on acid/base chemistry because that came up a lot and I know we were supposed to already have the general idea of it. It just seemed to come up more then anything else and was the basis for a lot of the class. It would have been nice to have that explained a little more.

Maybe a table of template reactions.

Make test questions easier

TA hosted reviews for tests would be nice. More opportunities for reviews outside of finding study groups.

I hate group work, but I'll admit that being forced to work with a small group of random classmates to answer problems could have helped. I would imagine that any sort of organized group work would have to be connected to the lab sections somehow.

I spent the summer learning the content in both organic chemistry I and ii, I truly think that the only way one can be successful in this class is to simply practice for hours on end.

Nothing this class is run excellently and I believe there are enough resources and help that as long as time is put in outside of class, it is possible to be successful.

more exam type style questions on learning catalytics then multiple choice

If it would be possible, having a lecture or a portion of lecture dedicated to learning the mechanisms? i found it hard to take the mechanisms on the excel sheet and put them onto the flashcards in a way to help me learn. I am a visual learner and so putting something on a notecard from the excel was difficult and it caused me to learn it incorrectly

I think the innovations already in place are helpful for learning the material in this class.

ALEKS would help this class. PLEASE switch to ALEKS. Mastering was awful and torturous.

I would recommend not to get the model that was on the syllabus because I find it really difficult to model with, but other than that there is only so much that you can do. I just always think it's important to look at the average of the class and make sure that they are getting a C-specifically I think in courses like this, curves are necessary.

A helpful innovation would be some sort of study group/lab that is required to attend which would be very helpful to have others that can work together to figure out the problems. While it is helpful from TA's or the teacher that aren't learning this information for the first time and tend to explain it in more complicated ways.

Practice exam questions in class, so we know what we are doing on the exams. If the class average is so damn low why does the same material keep showing up on them. Doesn't seem to make sense when you make students feel like shit for failing exams. This course is a lot to handle at times. Made me develop good study habits for other courses, but I felt as if I was failing the whole semester. Take out learning catalytics, and make homework shorter.

Reviews before exams.

Maybe reviews every other week to refresh on what we've learned in that time period since so much of the class builds on each other, it would be nice to have refreshers to stay caught up.

The hardest part of this class is dealing with stress. The tests will always be stressful, so taking the load off of students by making homework an all-or-nothing grading style and not grading on Learning Catalytics would be best.

Offering a little more extra credit would be beneficial because it would help students not to worry as much about their grade and be able to focus on learning the material. Other than that, altering your style of teaching is the only way that would be more beneficial. Trying to put concepts into terms students can understand would help more.

More in class practice with synthesis. While remembering reactions largely needs to be memorized outside of class time synthesis could probably use more class time.

I dont have any suggestions.

a better book

Don't waste so much time with Learning Catalytics. It is not a helpful tool. This class would be better if it was smaller and done in such a way where there could be a paper quiz every day (this is how my community college did it). This forces everyone to learn the material and to keep up.

Posting practice question online maybe once a week just as a self quiz/practice. Just an optional set of question like what you would see on a test. Other classes I have been in did this and it was very helpful.

Review sessions before exams outside of class would be nice.

Don't use Pearson

Maybe extra optional homework questions with more retrosynthesis and comprehensive reaction questions that could be used to study for test. Other than that this is just a hard course so even with large amounts of studying it is going to be difficult.

This is hard to answer, there is so much to cover in Ochem. I have read outside sources and come to realize that memorization is not ideal in ochem compared to understanding how things work. I feel like memorizing the name of a hydration reaction should not be worth as many points as knowing how the reaction proceeds. That said, maybe less of an emphasis on memorizing and more on working with the reactions and even more synthesis.

The textbook was not really helpful, when I went to look up a reaction it had only 3 pages or so for that reaction which did not help me answer homework questions. I think in class participation should be based on participation rather than getting the answers correct.

Maybe a worksheet in lab every week that talks about the mechanisms

i would have liked to have the lecture recorded on tegrity so i could go back and listen to the specific lectures.

Online practice exams with feedback

I think you guys supplied me with all the tools to succeed, however, I just made my life a whole lot harder through procrastination.

I think having more examples would be helpful. There are few examples of mechanisms and whatnot, but the "decorations" so to speak are confusing.

Recording the lectures would make studying with PowerPoint slides more effective.

The class is fine how it is.

weekly quizzing in lab pre lecture might also help to take some pressure off of the exams as well as again forcing more

participation and learning in the class.

Record the lectures to post on tegrity so that the students can review them if they weren't able to take good notes.

put all the reactions and mechanisms on one huge document.

Maybe some sort of cheat sheet for students.

I honestly do not know what more you can do. There is already so many resources for students to use. I feel that they do not take advantage of the wonderful TA's that are so willing to help. I also feel like most students just need to dedicate more time to learning this subject.

Group TA sessions. Not a fan. Some of us may feel insecure about our abilities, and don't want an audience of our peers present. Also, providing answers to the worksheets would be nice. I am a full time student, work 15 hours a week, volunteer for three separate groups, have other courses to study for, and enjoy 6-7 hours of sleep a night. How is this relevant? I don't have time to go get my worksheets corrected.

I know that there is a lot to cover in this course. One thing that I think you should consider doing is recording your lectures so that we can look over them at particular points when studying or change how you post the power point slides. I know that one of my teachers who post their power point slides also includes a note section at the bottom where they add important information relevant to the information already on the slide (sort of like an extra explanation). I have found that to be helpful in other classes and I believe this course would really benefit from this strategy.

do some in class pop quiz is better.

More Practice question and not just old exams!

Allow students who may have had to show up late because they have busy schedules and had to fit something unexpected in to log on to Learning Catalytics and answer the questions they may have missed once they get to class when the session is still in progress. For example, I show up and we are working on question 3; when I sign in I should also be able to answer questions 1 and 2 first and get caught up.

end of chapter quizzes that cover the basic concepts (im talking really basic) would be helpful, especially if they are cumulative of what has been covered.

Recorded lectures are a must.

not sure

Providing more examples of the mechanisms that are not shown within the textbook. I understand that many do not read the textbooks, but those who do would be able to get more in depth on the course if powerpoint lectures gave more examples from the instructor

I think you provide enough help between tutors and everything mentioned above. It is up to the students at this point.

A study guide that address specifics rather than previous exams/key.

If you are going to have a class the relies on so much technology...be there to help with our technical issues. Blackboard was a very new program which no one outside of class could help with. Pearson was horrible. And then I would email the professor to explain that I'm having issues opening the modules and his solution was to try a different computer. I only have so many computers. Not even the tutor center worked. How about you use a program that doesn't cause your students so much trouble?! The Pearson help line was useless. If you are going to be taking three days to email us back and give us no solution...don't be using all these online programs.

I do not have anything to add.

n.a

Its a hard course I don't think there is much you can do to make it easier.

I'd really like a non-comprehensive final. I'm pretty sure that isn't possible, but that's really all I want.

show the mechanisms on the reactions list

Organic chemistry is more like a language than it is a chemistry class. I have to take it again, so my approach to the curriculum will be different next time.

-Learning catalytics time extention, at least 10 seconds more.

-Expect students to read at home and come prepared with questions.

-Have lecture time be a place where everyone learns the chapter material through test like examples and the ability to ask questions on homework.

-Written Homework

Maybe a workbook full over pKa charts and reactions. Something like a 20 page pdf file on Dropbox would be helpful, rather than going through each test to find all over that. A workbook would just help for practice throughout the

semester.

Also explain the 345 reactions summary excel sheet better in the first week of class. I didn't understand how it worked and flowed together in the beginning.

More feedback on homework problems because test material is often taken from homework.

I don't know

I think providing a list of what you need to be doing each week or month at the beginning of the course would be great. You had a lot of great study tips and strategies that would have been great to know early on.

More time in lab working one on one with students.

More repetition. There is so much to learn, and when you only hear each thing once, it's nearly impossible to draw upon it later. Like simple learning Catalytics questions that are just regurgitation of what a certain functional group is. We are coming into this class with very little prior knowledge, so it can't be taken for granted that we know the structure and pka of every functional group and that we instantly have the knowledge to begin thinking about synthesis.

Nothing

The current technology and learning tools offered are sufficient to succeed in the course

More tutors in 401

Quite honestly quit pushing the flashcards so much. They were helpful for some things but it would have been more helpful to draw parallels between mechanisms to show how they are similar and how to distinguish them from one another. The flashcards just left reagents and mechanisms floating in my head and it was easy to mix them up.

I think that more focused lectures (more clarity about test material) would be useful.

Continue doing what you're doing.

If there were more opportunities for extra credit. for the other tests possibly

During the beginning of the course it was said that it would be recorded and put online. This is used extensively by many universities especially in science courses, how come this is not used in this course as it would be extensively beneficial.

If at possible, smaller class rooms would be better for a class of this caliber. Or two half hour lectures each lecture day instead of one. In between lectures would be a "lab" in which concepts would be solidified. My biggest problem was trying to focus on so much complex information for an entire hour straight, and then retain it.

A sheet that has the basic reaction mechanisms that we need to know.

Dont move the information around like you did this term. I learn mostly by doing practice tests weeks in advance, so when half that material isnt relevant or there is information that isnt on those tests, it sets me back a lot. Also, have more TA hours. The TA's helped me out so much, but sometimes they are so busy that im forced to go home when the office hours for that day are done with questions unanswered.

Cheat sheet for tests with pka tables. Memorizing pka isnt necessary at our level, we should be tested on synthesizing

Maybe implementing a sort of quiz system through learning catalytics besides the in class questions so that students are continuously in the exam studying mode and so they are motivated to come to class on typically skipped days (fridays).

Additional online problems for practice

Described above.

On the online homework, it would be extremely useful to have a "explain this problem" section after the problem is answered (either by the student or by given up on) so students can better understand the work needed.

Maybe if there was some kind of weekly review sessions on new material offered by TA's or an additional lab day that was for a shorter period of time just to review material.

A packet was available on the website for nomenclature and I wish that was the case for mechanisms. The excel document simply isn't enough and while I sometimes understand a mechanism and can provide it when directly asked for, choosing a mechanism of the final exam pages is very difficult for me as I lack the skills to differentiate with confidence.

No powerpoints

At the beginning of the semester, professor Crouch mentioned the installment of video cameras in which the lecture could be recorded and posted on line. I feel this would be extremely helpful and I wish that we were given this tool as I feel I would have done better. With the lecture on line, we can listen to it again if we didn't understand a concept in

lecture.

Get rid of online homework so students can spend more time studying and less time being frustrated.

I think if you had more practice problems with answers that would help a lot.

The class was overwhelming in the end. The beginning material was easy, but I felt like as the class went on harder concepts were crammed into a small amount of time.

It would help me at least if there was an option for some online homework that was not for class credit and was for our development if needed, that would walk us through mechanisms or specific reactions in a step by step manner that allowed us to fundamentally understand each chapters contents.

I think better alignment of labs to material learned in lecture would help. I had a Tuesday lab so I was ahead of lecture most of the time, this made me learn the material on my own ahead of time. However, if I had a better understanding of the material before lab (lectures gave this to me) the labs would have been more conducive to learning for me. I would like to have an additional set of post lecture or even pre-lecture clicker questions that you could do online. If they were for credit or not I think they would be useful. My biology class did little prelecture quizzes that helped engage me before the lecture.

Study guides

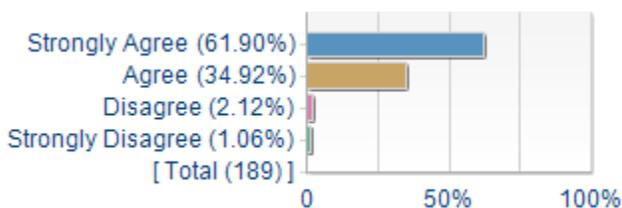
Maybe offer a review session once a week with TAs to go over what we learned that week to better enforce it and answer questions.

None

Taking video of the class would help a lot with review for the class. It was talked about at the beginning of the quarter the videos were not taken.

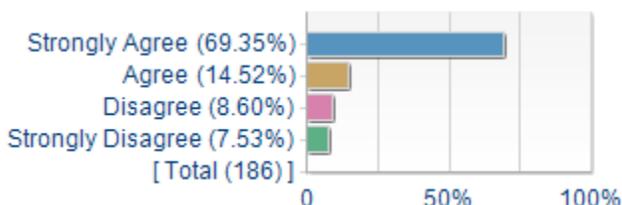
I would like a typed up page listing all of the reactions, concepts, and pages in the book that are covered before each exam. I would also like more practice problems that can be voluntarily done, with posted answers.

All tests are written to take an average student about 45 minutes to complete. Given the importance of exams we do not want you to have the time stress of an in-class exam so that's why we went to evening exams with extra time. This approach worked well for me.



Statistics	Value
Response Count	189
Mean	3.58
Median	4.00
Mode	4

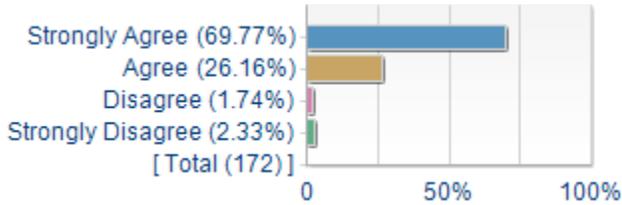
I prefer Friday evening exams (2 per semester, 2 hours long, from 5-7pm or 6-8pm) over morning exams (Monday-Thursday, 2 per semester, 2 hours long, 6-8am).



Statistics	Value
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Response Count	186
Mean	3.46
Median	4.00
Mode	4

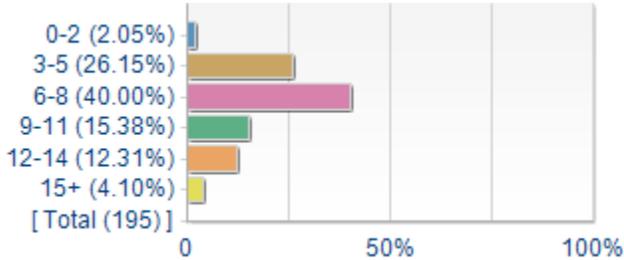
This semester we continued to use Facebook as a discussion forum where you could post pictures of your homework questions in order to get help. This approach worked well for me.



Statistics	Value
Response Count	172
Mean	3.63
Median	4.00
Mode	4

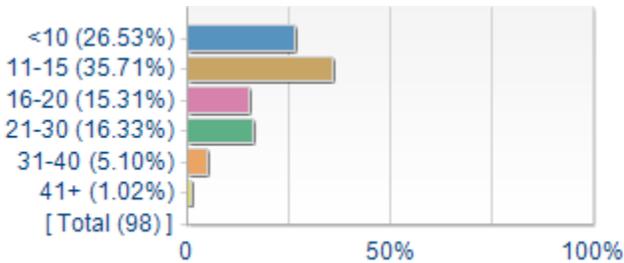
Demographics

Other than the hours you were in lab, how many hours per week were spent preparing for this class (studying, lab write-ups, other activities related to this class)?



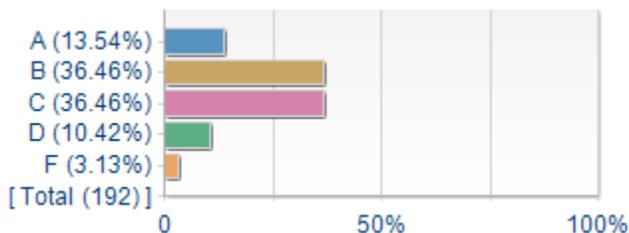
Statistics	Value
Response Count	195
Mean	3.22
Median	3.00
Mode	3
Standard Deviation	+/-1.15

If you worked for pay, how many hours per week (on average) did you work?



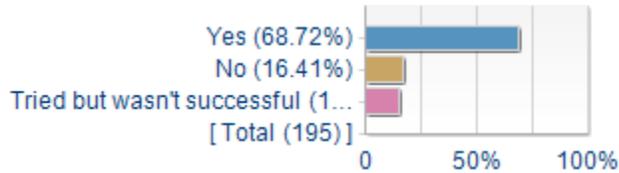
Statistics	Value
Response Count	98
Mean	2.41
Median	2.00
Mode	2
Standard Deviation	+/-1.24

What grade do you expect to receive in this class?



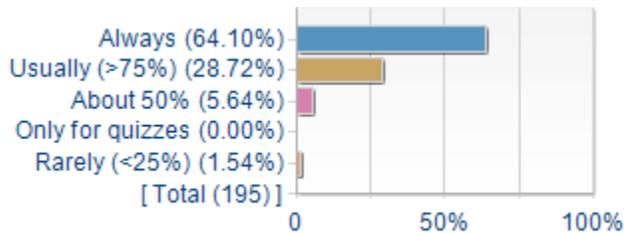
Statistics	Value
Response Count	192
Mean	3.47
Median	3.50
Mode	4, 3
Standard Deviation	+/-0.96

Did you seek help when you needed it?



Statistics	Value
Response Count	195
Mean	2.54
Median	3.00
Mode	3
Standard Deviation	+/-0.74

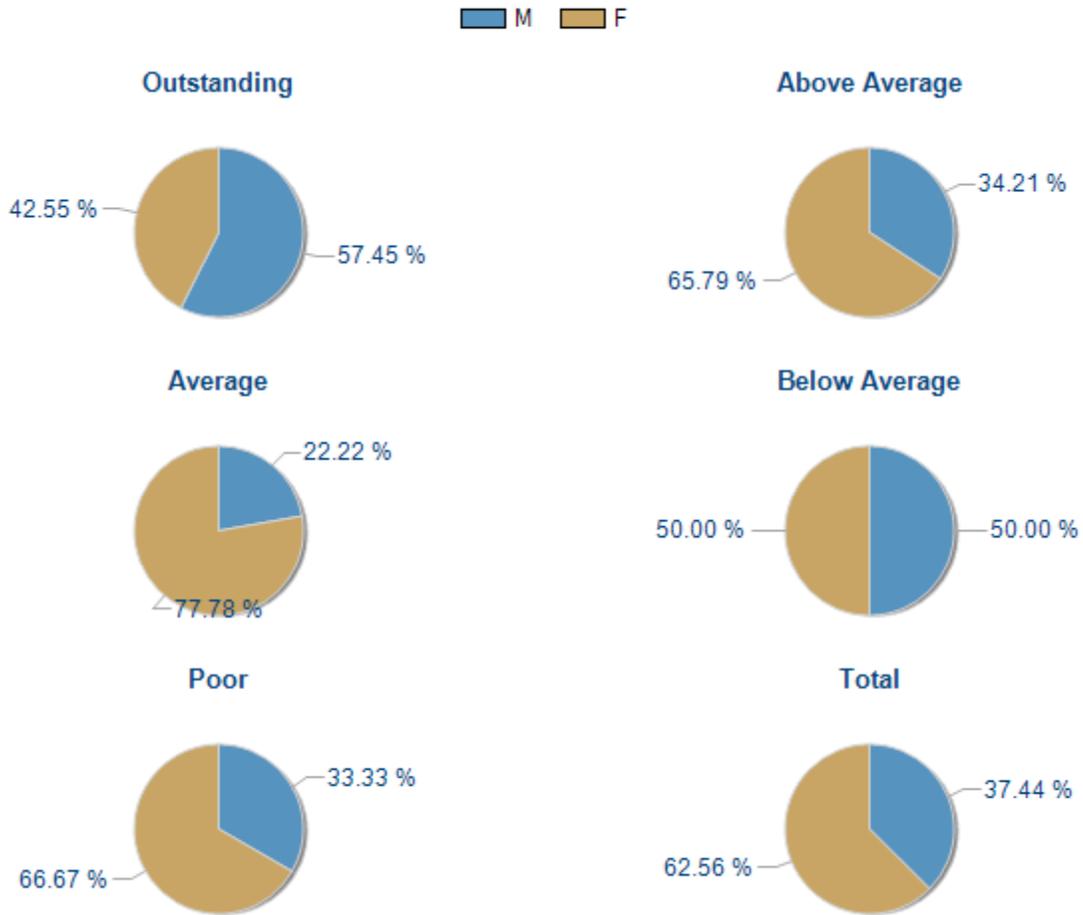
I attended class lectures...



Statistics	Value
Response Count	195
Mean	4.54
Median	5.00
Mode	5
Standard Deviation	+/-0.74

Crosstabulations of Demographics against Overall Rating of Instructor

Gender



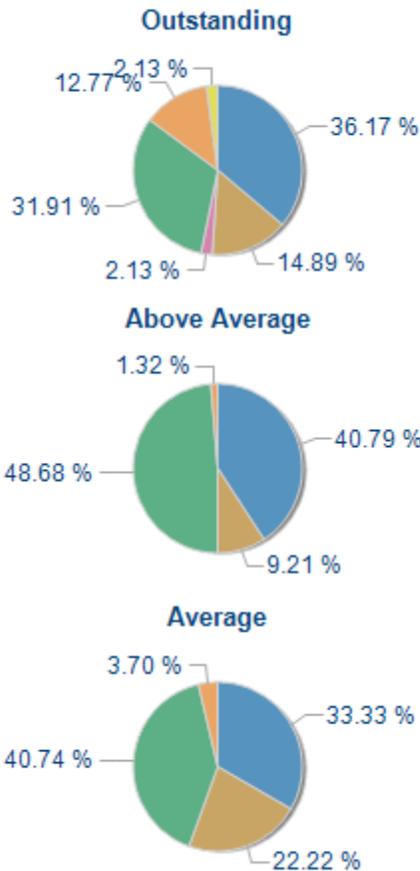
Gender (continued)

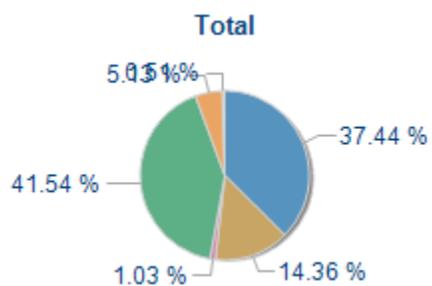
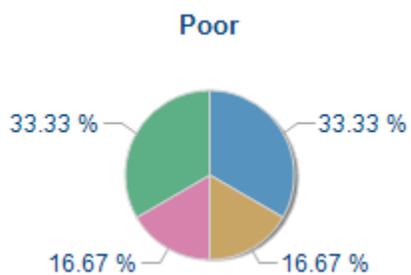
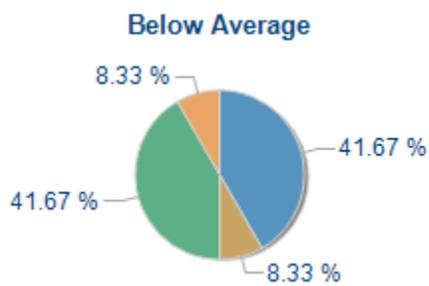
gender	Outstanding		Above Average		Average		Below Average		Poor	
	Count	%	Count	%	Count	%	Count	%	Count	%
M	27	57.45	26	34.21	12	22.22	6	50.00	2	33.33
F	20	42.55	50	65.79	42	77.78	6	50.00	4	66.67

gender	Total	
	Count	%
M	73	37.44
F	122	62.56

Class standing

■ Sophomore
 ■ Post-Bacc Undergraduate
 ■ Junior
 ■ Freshman
 ■ Graduate
 ■ Senior





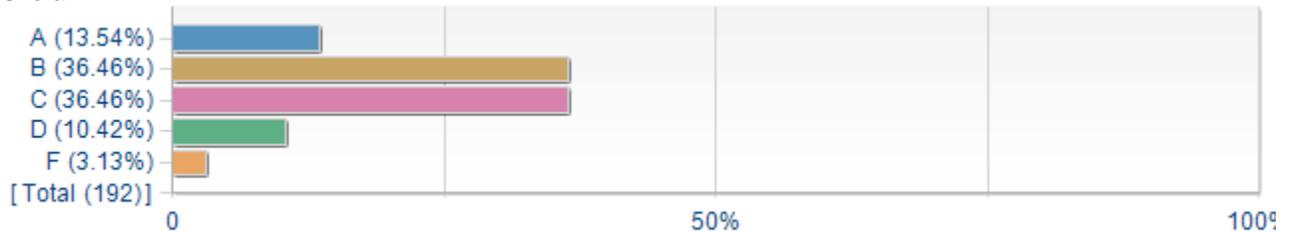
Class standing (continued)

class_standing	Outstanding		Above Average		Average		Below Average		Poor	
	Count	%	Count	%	Count	%	Count	%	Count	%
Sophomore	17	36.17	31	40.79	18	33.33	5	41.67	2	33.33
Senior	7	14.89	7	9.21	12	22.22	1	8.33	1	16.67
Post-Bacc Undergraduate	1	2.13	0	0.00	0	0.00	0	0.00	1	16.67
Junior	15	31.91	37	48.68	22	40.74	5	41.67	2	33.33
Freshman	6	12.77	1	1.32	2	3.70	1	8.33	0	0.00
Graduate	1	2.13	0	0.00	0	0.00	0	0.00	0	0.00

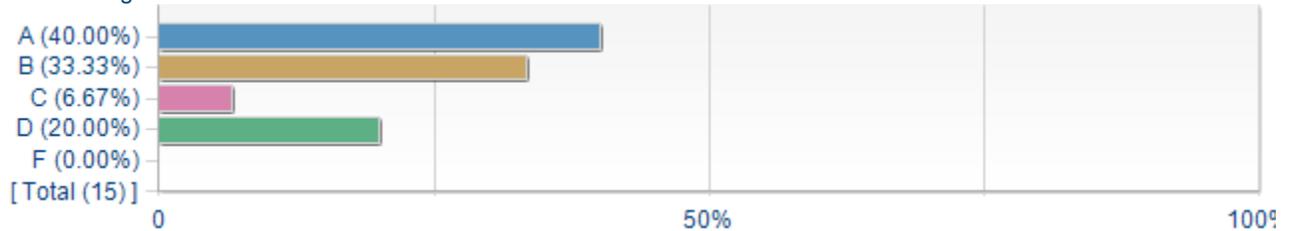
class_standing	Total	
	Count	%
Sophomore	73	37.44
Senior	28	14.36
Post-Bacc Undergraduate	2	1.03
Junior	81	41.54
Freshman	10	5.13
Graduate	1	0.51

Grade Expected by Overall Course Rating broken out by each rating

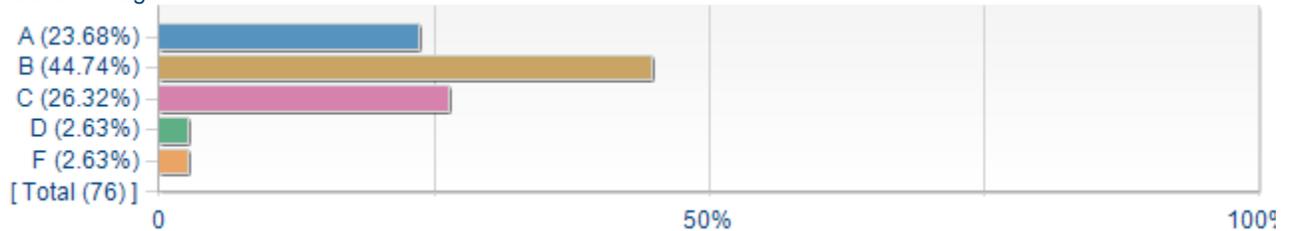
Overall



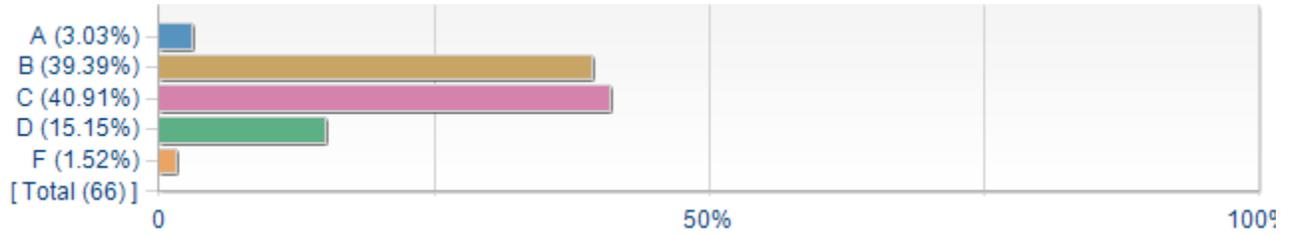
Outstanding



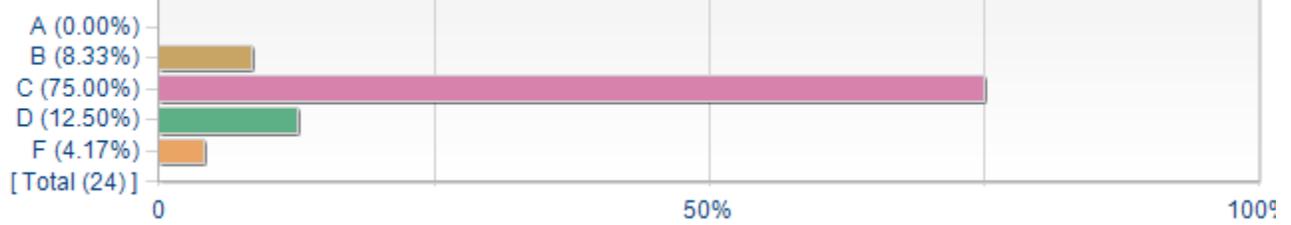
Above Average



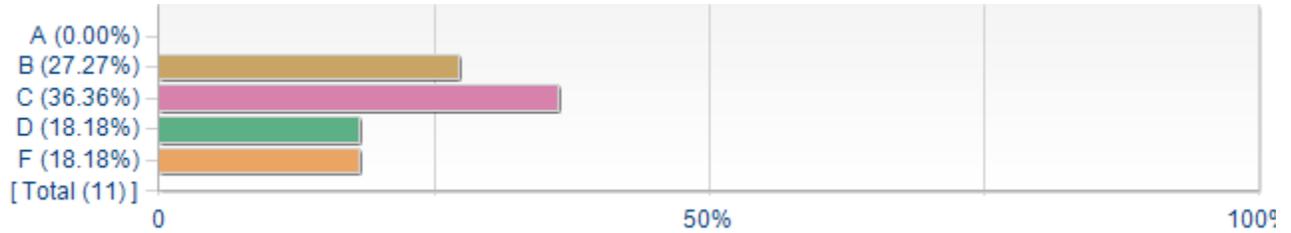
Average



Below Average



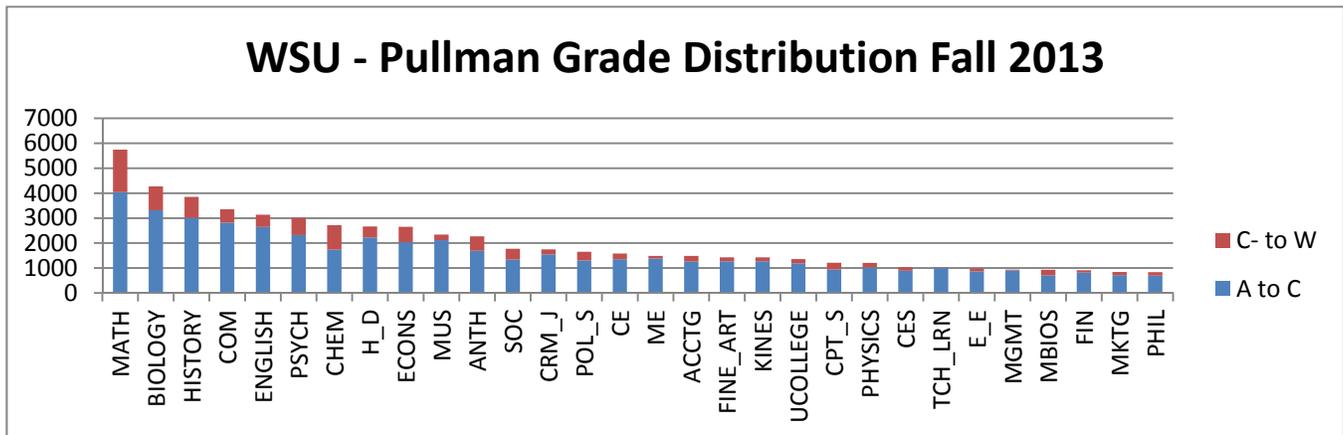
Poor



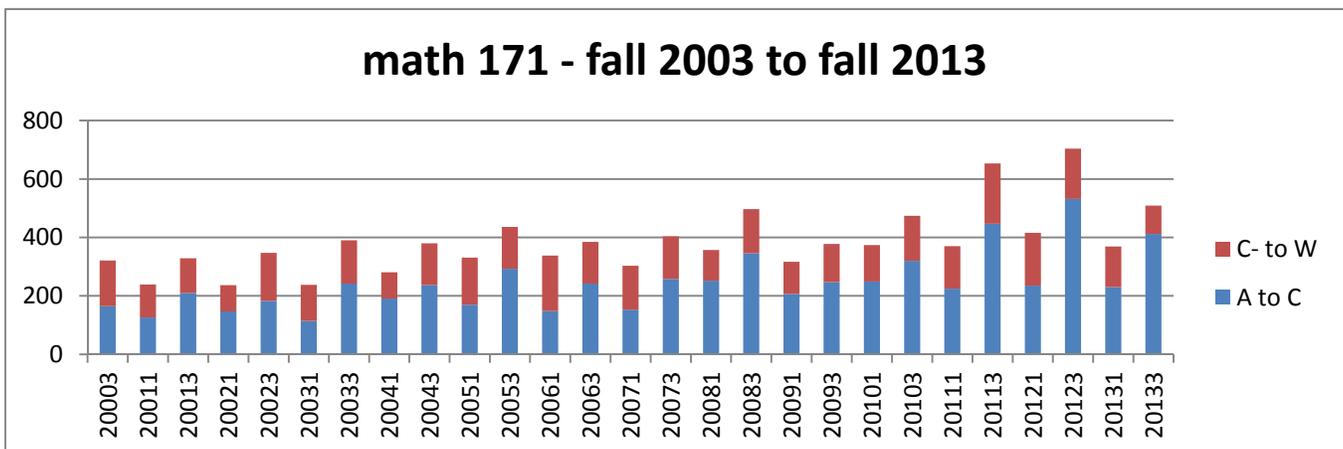
Appendix 4 - Example Curriculum Reform Model

Introduction

Introductory science and math courses at WSU have historically high “C-/D/F/W” rates, especially compared with other departments, which deter students from majoring in high demand STEM areas. For example, the following graph shows grade distributions by department from fall semester of 2013.



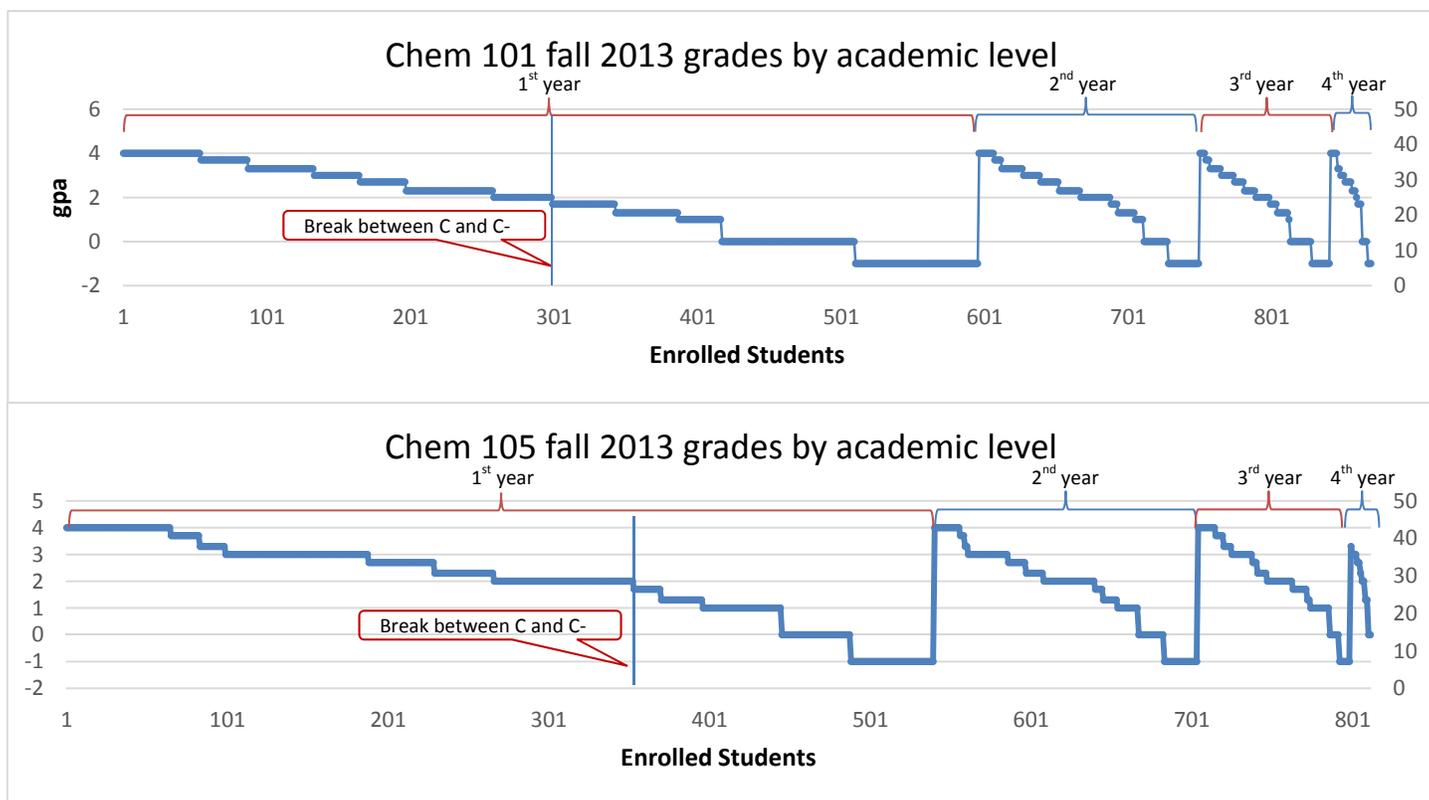
As the most outstanding example, math awarded nearly 6000 letter grades last term where almost 1800 were below a grade of C. If this analysis is filtered for only first semester calculus (Math 171) and plotted over a 10 year period, the following graph is obtained. This graph reveals the problem with “C-/D/F/W” rates is not new and difficult to predict. To make matters more confusing, regression analysis was used to determine if a grade outcome prediction in math 106, 108, 140, and 171 could be made on the basis



of the ALEKS math placement exam, the SAT math exam, or a student’s high school gpa. Little correlation was found between ALEKS or SAT scores versus course grades. There was a slightly higher correlation using high school gpa ($r^2 = .35$). In other words, an incoming student could score 90 or more on the ALEKS math placement exam (100 is a perfect score) and still have about a 60:40 chance of being above the C letter grade threshold. WSU Institutional Research has confirmed this analysis. Lack of preparedness in math is a fundamental problem as math literacy is required for every STEM degree program at WSU. Students who intend to major in STEM fields often change their major after receiving poor grades in introductory science and math courses. To summarize, WSU 1) has extraordinarily large C- and below rates, 2) relies on math placement exams that fail to predict success, and 3) is not meeting a state mandate to increase the number of STEM graduates.

As shown above for a single math course, poor outcomes in introductory level science and math courses are nothing new and many curriculum reform models have been created over the years to address this issue – however, the underlying cause of these educational outcomes is almost always based on anecdotal evidence, with the primary fallback reason being lack of student preparation to perform at a college level. While this is likely a huge factor, other issues such time management and maturity also must play a role. Advising must also be explored to determine if students are overloading on difficult courses in their first college term. Further, by exploring the learning style transition between a student’s final year of high school and first term of college, rate may also factor in. For example, a student who takes high school calculus almost always has an academic year to complete what at college would be taught in a single semester – therefore entry level courses not only provide academically challenging material, they may outpace the student’s ability to amass information or make the deep learning connections required for STEM success. The following graph shows grade distribution for two intro level chemistry course (Chem 101, non-majors; and Chem 105, majors) during the fall of 2013 broken out by grade level. The left vertical axis is grade points (4=A, 3.7=A-, 3.3=B+, 3=B, 2.7=B-, 2.3=C+, 2=C,

1.7=D+, 1=D, and -1=W), the right vertical axis is class standing (10=freshman, 20=sophomore, 30=junior, and 40=senior). The horizontal axis represents all grades given in the term.



Not surprisingly for a primarily freshman oriented class, this population of students have the highest below C numbers. That is telling in that below C grades decrease as grade level increase, which may indicate maturation has an influence in grades. In looking at just freshman students in both Chem 101 and 105, the specific grades are given in the table (right).

Finally, student financial aid may play a role in the number of W grades given in introductory science and math courses. If a student thinks he or she will earn a grade of C or below, they are often advised to withdraw from the course rather than risk a lack of satisfactory progress that would jeopardize financial awards.

To address the poor student learning outcomes in introductory science and math courses, student-centered learning interventions are being encouraged; however, given the number of variables that likely account for these outcomes, accurate assessment of the efficacy of such programs will be very difficult. Rather, it is suggested that in addition to the desired student-centered programs being explored, specific interventions are adopted that can help identify and treat the underlying causes of poor performance. These will be outlined next and may help identify the underlying causes for poor grades seen during a student's first year at WSU. We propose to work in partnership with Math and Biology but given that this proposal is outside the scope of the recent Provost RFP, alternate funding sources are required.

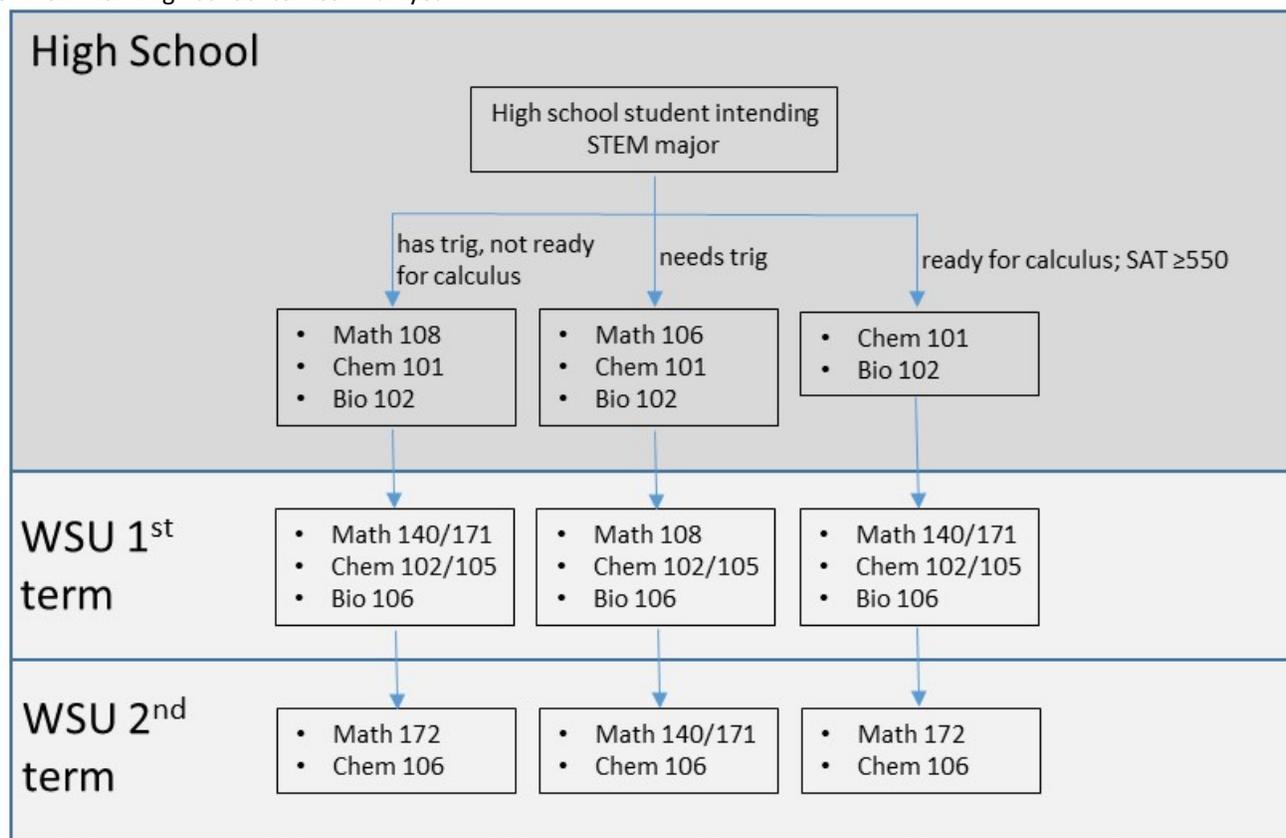
	Freshman Only Fall 2013			
	Chem 101		Chem 105	
A	54	9%	65	12%
A-	33	6%	18	3%
B+	46	8%	16	3%
B	32	5%	89	16%
B-	32	5%	41	8%
C+	61	10%	37	7%
C	41	7%	87	16%
C-	44	7%	17	3%
D+	44	7%	26	5%
D	30	5%	49	9%
F	93	16%	43	8%
W	86	14%	52	10%
	596	100%	540	100%
C- and below		50%		35%

Suggested Intervention in Chemistry 101:

Chem 101 serves both as a stand-alone non-majors chemistry course and as a prep course for students planning on taking Chem 105. In the fall semester of 2013, 50% of the enrolled freshman students earned a grade of C- or below or withdrew. Similarly, 35% of students in Chem 105 earned grades of C- or below or withdrew. As stated above, these high numbers may be attributed to 1)

lack of preparation, 2) overloading of difficult courses, or 3) inability to successfully deal with the rigors of a 15 week instructional term.

- 1) Suggested interventions in Chem 101 that would address these potential factors include
 - a. Adopt the math 106/108 model in Chem 101/105. In chemistry, this model would allow a student who earned a low grade on the first hourly exam in Chem 105 to transfer mid-semester to Chem 101. Math has a similar program involving a late-start version of math 106 as a start-over for students who perform poorly on their first exam. Math calls this a reboot.
 - i. Several publishers offer a “direct bill” model that would facilitate this model. For example, if Pearson published textbooks were used in both Chem 101 and 105, then students who reboot before the 30th day of instruction would be able to swap course materials with no additional cost.
 - b. Create separate Chem 101 & 102 lab courses that do not require co-enrollment with lecture. These lab courses would be offered each semester and have experiments more consistent with the majors who enroll in this course.
 - i. Decoupling the lab component from Chem 101 and Chem 102 would reduce the overall course complexity to include only lecture, homework, hourly and final exams.
 - ii. Lab development of the lab course (former labs for Chem 101 & 102) would take place summer and fall 2014. Labs would be tailored to be relevant to majors served (agriculture & nursing for example) thereby increasing student interest.
 - c. Replace recitation sections with peer facilitated small group learning sessions that focusing on learning problem solving and critical thinking skills.
 - d. Adopting a new online homework system (shared system for all gen chemistry students) that allows identification of conceptual bottlenecks and can run on a variety of platforms.
- 2) Develop online (no lab component) Bio 102/Chem 101/Math 106/108 courses (in conjunction with Global Campus and the Department of Teaching and Learning) to be distributed to pre-identified high school partner schools. These partner schools will help identify seniors who have interest in attending or have been accepted to WSU. Tentative approval for low (or no) cost has been obtained. These courses would be 15 weeks and, in addition to content, allow high school students to become accustomed to the pace of college introductory STEM courses. Students would receive WSU credit for these courses. Proposed workflow from high school to freshman year:



This path would place students into a college credit-bearing math course by the second semester of their freshman year thereby not lengthening the time to degree. This model is being used successfully at several universities around the country (including the University of Idaho) and is also known as dual credit. Several publishers support this dual credit model by offering reduced pricing structures for participating high school students.

- 3) Develop a tracking method to determine why a student drops or withdraws from introductory science and math courses at WSU. Currently academic rule 67 allows a student to drop a class without record up to the end of the 30th day of the semester. Additionally a student may withdraw from a course after the 30th day through the 13th week. Every student has a total of four withdrawals that may be used during his or her undergraduate career at WSU. In either case there exists no tracking system that identifies a student's reason for dropping or withdrawing (fear of low grade, change of major, etc.). In February 2014 a simple survey was constructed and emailed to each student who withdrew from either 101 or 105. The survey question and summary are below.

a. Survey question

We are trying to improve our General Chemistry program at WSU. You are receiving this survey because you withdrew from either Chem 101 or Chem 105 during fall term 2013. We would greatly appreciate it if you took a minute to tell us why. Please check the box that best describes your reason for withdrawing.

b. Summary of responses

<i>respondents</i>	<i>n=34</i>	<i>n=36</i>
questions	Chem 101	Chem 105
I changed my major and no longer needed the course	9%	6%
I expected to fail the course	50%	44%
I expected to receive a lower grade than I needed for my career path	29%	28%
Other (please explain below)	12%	22%
	100%	100%

We propose to request the enterprise systems group at WSU modify zzusis to include a "reason code" that can be used to track drop/withdrawals.

- 4) Implement peer advising to address time management and overload. This would be done in conjunction with CACD and perhaps Summer Alive!

Assessment

- 1) Track success rates in Chem 101/105 reboot both during the semester (for those students who dropped back from Chem 105 to Chem 101) and in the subsequent semester (those students who dropped back from Chem 105 to Chem 101 and then in the following term enrolled in Chem 105).
- 2) Implement at-risk early warning systems using the new Learning Management System. This system tracks student's grades and online access to course materials and flags those students who are below the average.
- 3) Implement a formative course evaluation to track student satisfaction during the course.
- 4) Track grade data for students participating in online high school prep courses and how those relate to success in introductory science and math courses at WSU.
- 5) Identify drop and withdrawal reasons and determine if those can be reduced.

Appendix 5 – Peer Evaluations Jeff Jones

1/8/15

Peer evaluation for Dr. Greg Crouch

For a number of years I have worked with Dr. Greg Crouch in developing and delivering organic chemistry to undergraduate students. In 1998 upon my arrival at WSU we implemented peer led learning in organic chemistry. Greg was instrumental in the implementation and he advised a graduate student whose dissertation involved the evaluation of the effectiveness of this program. Greg reached out to the Center for Teaching and Learning to develop peer leader training classes. In general this was a very effective tool that eliminated the gender bias, and decreased the failure rate in organic chemistry. Unfortunately, the program was deemed too expensive and was discontinued, but Greg has been able to revive the program in second semester Organic (Chem 348). Greg's role in this effort and his desire to critically evaluate the outcome underlines Greg's approach to teaching. He is constantly experimenting with new methodologies, and making every effort to evaluate if the new methods are working for the students.

Along these lines, Greg enabled our change from a traditional organic sequence (Chem 240, 340 and 342) to our present day spiral approach (Chem 345 and 348). Greg has been the leader in standardizing the course material in Chem 345, which is required for multiple sections and for a smooth transition from 345 to 348. This has been an important and significant change in the organic curriculum, which has increased the student's flexibility. In our old system a student would be tracked into either a single semester (Chem 240) or a complete sequence (Chem 340 and 342), while now students can choose after the first semester to proceed or not, while still having a complete class in organic chemistry. This program has been very successful, and I believe most of the credit should be given to Greg.

In the classroom, Greg does a fantastic job of engaging the students. His lectures in my experience have a large amount of give and take, with the students actively participating. This is an amazing accomplishment given the large class sizes (>200) students he is normally teaching. He does a great job of incorporating new material, based on novel findings mainly in health related areas, which in turn keeps his class fresh from semester to semester. While it would be easier to teach exactly the same material every semester, he always makes the extra effort to bring in new material and to evaluate new teaching modalities. He is also very good at developing good tests and worksheets. No student in his class ever has a reason to miss an answer because of an ambiguous question. He does this by connecting the structure of the question in his homework and practice exams to that of the class exam. This is very important in organic chemistry since many of the students are very anxious as a result of the complexity of the material. Overall, Greg's exams fairly assess the student's ability to take a set of tools and apply them to a novel problem. Much of Greg's exams are dependent on the use of critical thinking

skills as opposed to memorization of information. He is successful where many others are not in teaching critical thinking skills because he thoughtfully emphasizes the most important tools, he gives the students practice in using the tools, and he actively illustrates the use of the tools during lecture.

Greg has always been one of the first to embrace and test new technology. He was an early adopter of online homework, and has worked with the publishers to make this product better. Most recently Greg has embraced BROD technology, which allows for more interactions and feedback on how well students are comprehending a topic. This is a worthy experiment that allows for the formation of small groups, even in big classrooms. Greg's knowledge and thorough testing of technology has helped all of the organic faculty to be able to smoothly adopt the technology once it has proven advantageous.

Finally, Greg is our liaison with the other WSU campuses. His main work in this area is to ensure that the chemistry classes taught outside of Pullman are of the same quality as those offered here. This is an amazingly complex, if not impossible, task given the lack of resources and faculty at the branch campuses. His work has identified a number of weaknesses and he is developing methods to help correct them. Greg is a very good person to have doing this since he is a good mentor, who is patient and supportive of the faculty.

In conclusion, Greg is an outstanding Professor who has struck a perfect balance between rigor and reality. His dedication to teaching chemistry should be rewarded in any way possible.

Jeffrey P. Jones
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Ralph G. Yount Distinguished Professor of Chemistry
and Donald and Marianna Matteson Professor of Chemistry
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Appendix 6 – Peer Evaluations Cliff Berkman

January 8, 2015

Re: Peer Evaluation for Dr. Greg Crouch

To Whom It May Concern,

I am pleased to provide this enthusiastically positive peer evaluation for Dr. Greg Crouch. I am currently the convener of the Organic Division in the Department of Chemistry here at WSU and I am familiar with Greg's activities on a few levels.

In terms of teaching, I have worked closely with Greg since Fall 2007. In several semesters, we have jointly taught 2 simultaneous sections of CHEM 345; a large service course for a number of science, engineering, and pre-health majors. In those semesters, Greg spearheaded the development of the course syllabus and lecture outline as well as managed the exam administration, TAs, and laboratory component. He also explored on-line homework modules to improve student-learning outcomes. We communicated almost daily on our progress and delivery of the course material, as well as any course-related problems; Greg is an excellent colleague, especially in this coordinated team teaching structure.

Within our Organic Division in the Department of Chemistry, Greg serves as the graduate student coordinator. He manages the TA assignments, keeps track of our students' progress, coordinates and administers prelim exams, and is the key advisor for our students. In addition, Greg shepherds the process for curriculum changes for our graduate course offerings. Our graduate students are extremely grateful for his dedication to their advising and program of study. Lastly, it is important to note that during the past few years, Greg also coordinated WSU's annual Matteson Symposium that attracted pioneering and preeminent chemists as speakers, one of which was a recipient of the Nobel prize in Chemistry. During

In summary, Dr. Crouch is a dedicated instructor and invaluable colleague. Without his contribution and effort, I am certain that our course delivery in the undergraduate and graduate organic chemistry program would not be as efficient and effective as it is. Please feel free to contact me if you need further information.

Sincerely,



Prof. Cliff Berkman
Tel: (509) 335-7613
Email: cberkman@wsu.edu