



ADVENTURES IN TEACHING

Adam Cook

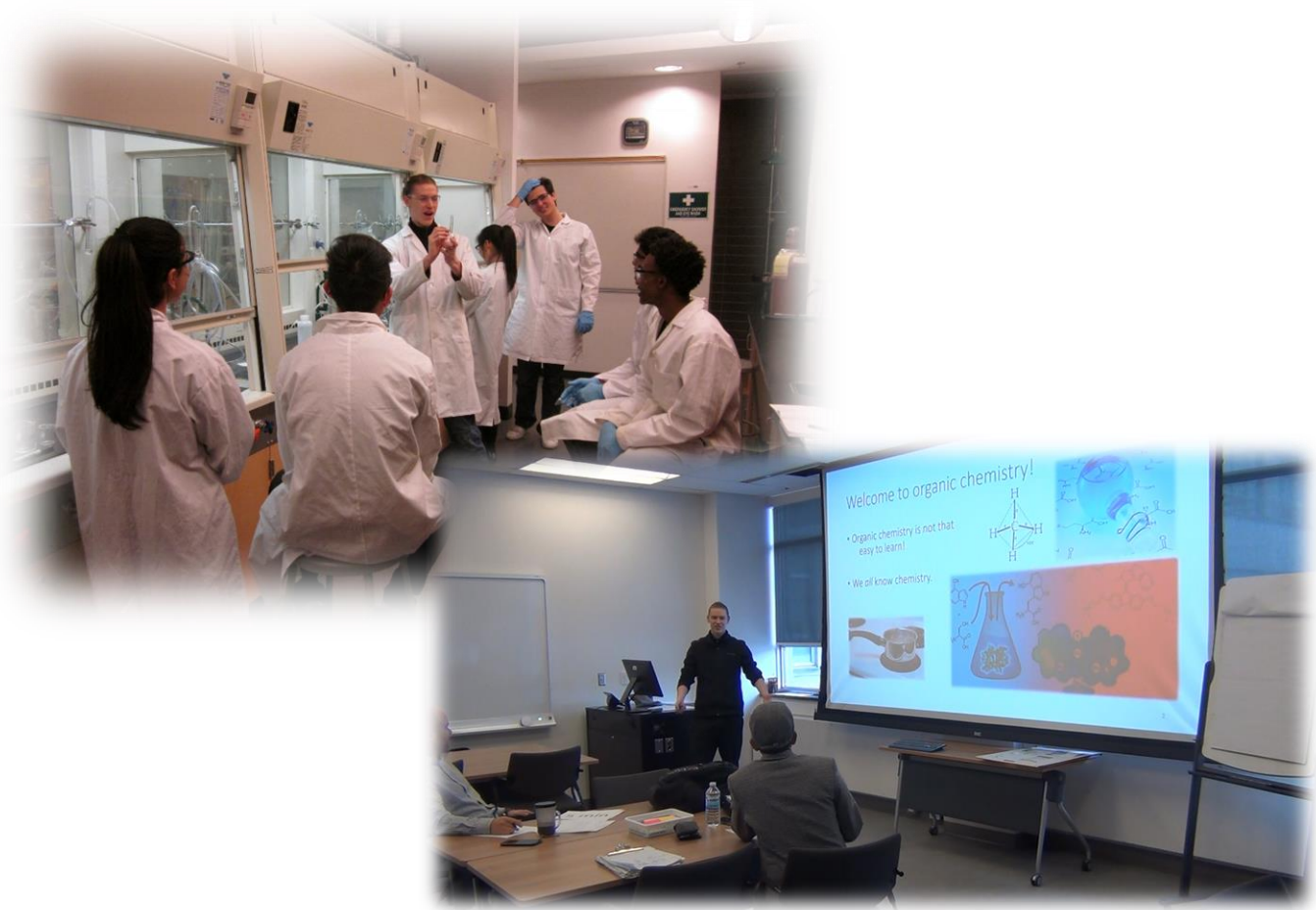
Teaching Dossier

University of Ottawa

January 2020

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1. Teaching Philosophy and Strategies

vocation (noun): a summons or strong inclination to a particular state or course of action

I can recall sitting in high-school religion class, being taught the concept of a “vocation” – a personalized call from God to express one’s qualities in a way that best benefits as many people as one can reach. This class kicked off a search for my own vocation – six years later I can confidently say that to become a teacher is to fulfill my vocation. As such, my teaching philosophy is sure to be a unique one – teaching is not just what I seek to do in my professional life but also in my everyday life. To me, the best life is one in which I become a valuable teacher among my community, inside and outside of the classroom. To me, a valuable teacher is one who’s enthusiastic in what they teach and inspirational for those they teach towards. I hope to create a fun, enthusiastic environment within the classrooms of my future as I believe that this kind of atmosphere is the kind which promotes the best learning. I believe that a teacher should act as the role model for the entire discipline in which they teach.

Over the course of my career in teaching, I will strive to teach above and beyond “just chemistry” as it will always be my hope to inspire the students of my future with lessons that live beyond the classroom. I’ll not only teach chemistry – but also the ways a student may apply the themes and messages of chemistry towards their everyday life. While saying this, providing my students with the chemical knowledge which they will need as they tackle their careers in science will exist as the primary goal.

A key criticism I have of the contemporary chemistry curricula is that it does not stress the underlying web of chemistry enough. Further, I believe that the curricula move too fast, not allowing students enough time to truly grasp the concepts which they learn at an introductory level that will return time and time again over the course of their academic pursuits. To combat these perceived issues, I will strive to highlight core concepts and themes as I teach them, and will use all of the tools available to me (such as the internet, interactive demonstrations and active learning classrooms) in order to make the underlying themes memorable within the minds of my future students. Further, I will seek to review concepts often in order to further drill them into the minds of the students.

I believe that the best way to learn chemistry is through doing problems. Thus, I will provide my students with a lot of practice problems, presenting them as exams that will not count for any marks. I will provide students with a different exam each Friday and will post the solutions on the subsequent Monday, in hopes that students can use the exams to solidify the concepts which were taught throughout the week. When designing exams, I will construct them such that it is easy to get a 60, hard to get an 80, and almost impossible to get a 100. In doing this, I will minimize failures while still allowing the best students a tough challenge to get to 100.

A key theme of my teaching style is the “sports coach philosophy” – rather than being simply an instructor teaching a group of students about chemistry, I will aim to be the coach of a *team* of students with the aim of turning my *team* into the best chemists that they can be.

2. My Teaching Experience

2.1 Teaching appointments

2019-2020 **Lab Demonstrator**, University of Ottawa

*Courses*¹

CHM 1311: General Chemistry

Supervised 72 students from a range of academic programs in a laboratory setting, teaching them techniques that are fundamental in the pursuit of a career not just in chemistry but in science. This was a mandatory course for all students enrolled in a BSc at uOttawa. My duties consisted of overseeing two three-hour laboratory periods each week, as well as marking lab reports and holding office hours.

CHM 1321: Introductory Organic Chemistry

Supervised 28 students in a laboratory setting, teaching them fundamental techniques in organic chemistry such as distillation, recrystallization as they learned how to conduct a chemical reaction, purify reaction mixtures and analyze their results. My duties consisted of overseeing two three-hour laboratory periods each week, as well as marking lab reports and holding office hours.

CHM 2128: Advanced Structure and Characterization of Materials

Supervised 10 students in a laboratory setting, teaching them how to create, analyze and characterize advanced materials such as nanoparticles and LED crystals. My duties consisted of overseeing one four-hour laboratory period biweekly, as well as marking lab reports and holding office hours.

2016–2017 **Lab Demonstrator**, University of Ontario Institute of Technology

*Courses*²

CHEM 1010: General Chemistry I

Supervised 48 first-year students from a range of academic programs in a laboratory setting, teaching them fundamental chemistry lab techniques while introducing them to the laboratory environment. My duties also included marking laboratory reports, midterms and final exams.

CHEM 1020: General Chemistry II

Supervised 48 first-year students in a laboratory setting, teaching them fundamental chemistry lab techniques. Duties also included marking laboratory reports, midterms and final exams.

2.2 Other teaching experiences**2016–2017 Lead Volunteer, Faculty of Science, UOIT Let's Talk Science Program**

Developed and led an outreach program along with Dr. Kevin Coulter that taught several high school students to use SEAL solar cell technology kits in an attempt to develop an efficient water-splitting catalyst.

2.3 Laboratory Mentorship

Listed below are students whom I have mentored inside of a research laboratory. Duties of a mentor within the lab include teaching fundamental techniques, tools and behaviors to students who have not worked within a laboratory before.

2019 Haydn Maclean, BSc, University of Newcastle

Louis Brigandat, MSc, University of Lyon

2016 Robert Maillet, BSc, University of Ontario Institute of Technology

3. Teaching Quality

3.1 Formal evaluations and student comments

*Listed below are comments I received from students whom I acted as a TA for.*⁵⁻⁸

“... kind, easily approachable, nice and had a real interest in what he was teaching. He gave good feedback, and was a fair marker when it came to work.”

“... clearly explains the lab procedure and conducts the laboratory in a fashion that allows for a deeper understanding off theory behind the laboratories.”

“... really nice and helpful. Easily approachable and funny as well. His cheerfulness can wake you up for the 8am lab and can be such a support when you’re having a hard time with the lab. The compliments he gives makes the uneasiness about numbers fade away. He makes sure you get how to work through the lab questions as well as the lab procedures.”

“... very enthusiastic and very enjoyable to learn from.”

“... always makes sure everyone understands what the lab is about and will help anyone who looks like they are struggling. He makes sure to let us know what he will be evaluating before the lab starts and does a thorough demonstration of the lab each time.”

“... assists students whenever needed, and does so in a well organized and effective behavior. He helps me to enjoy my chemistry labs.”

“... by far, the best TA on campus and an asset to the university! Goes out of his way to help students succeed! We need more TA’s like Adam for our courses.”

3.2 Letters of support

Provided below is an excerpt from a reference letter provided to me from a former instructor⁹

“Adam has a very enthusiastic personality and professional demeanor; he is well respected and very respectful of others. He is very friendly and outgoing, and has great interpersonal skills, he can work well individually or in collaboration with other research group members. Adam must have great time management skills because he has done a lot of extra work outside of his course work, which includes volunteering as a speaker for our UOIT Science day talks, as an assistant for Open House chemistry demonstrations, and leading my “Solar Fuels Research” after school activity mentoring top high school students; Adam has a unique engaging and entertaining style of explaining chemistry to students which will serve him well as Teaching Assistant and lecturer in future years.”

– Dr. Kevin Coulter, Senior Laboratory Instructor, University of Ontario Institute of Technology

3.3 Peer evaluations

“... presented a difficult construct in a simple way.”

“... great visuals to help with what can be a complex concept.”

“... unique and enthusiastic delivery that helps us to understand the tough concepts that are associated with learning organic chemistry.”

Provided above are excerpts from evaluations provided from evaluators regarding a microteaching activity held November 10, 2019 in the context of the ESG 5300 course^{10, 11}.

4. Contributions to Teaching and Learning

4.1 Course development

CHM 8010: Chemistry Through the Ages: From Magic to Modernity

I have developed and prepared a syllabus and course materials for a course I would be interested in teaching in the future titled “Chemistry through the ages: From Magic to Modernity”. The goal of this course is to teach students about the history of chemistry through a demonstration of its developmental timeline, highlighting key figures and topics along the way.

4.2 Publications and presentations

2. “*Breaking Bad... Chemistry Habits*”, UOIT Winter Science Day, 2017

Presented a short lecture to over 150 high school students and their teachers at this teaching-focused outreach event. This presentation was constructed in an attempt to teach students to be critical of what they observe in the modern media regarding chemistry.

1. “*A Day in the Life of an Undergrad at UOIT*”, UOIT Winter Open-House, 2016

Prepared and presented a short lecture at a high-school recruitment presentation on educational chemistry and the true student experience, presented for an audience of over 150 high school students and their teachers. This presentation was constructed in an attempt to illustrate to students what they can expect during their time at UOIT.

5. Professional Development

5.1 Courses taken in order to further my development in teaching

ESG 5300 – Theory and Practice of Undergraduate Teaching, 2019

Taken from the course calendar:

“This course is designed specifically for graduate students and postdoctoral fellows who are interested in a career in university teaching. The course explores general themes related to the planning of university teaching, from learning theories to evaluation practices. Students will have the opportunity to explore the relationship between the theory and practice of undergraduate teaching. Using a reflection-based approach, this course also provides tools that help students, as future professors, to examine the signature pedagogies of their disciplines, as well as the impact of various teaching strategies they may use throughout their careers. This examination will ultimately help students make more informed decisions in their choice of teaching and learning strategies”.

ESG 5310 – Media Relations and Communication in Science, 2019

Taken from the course calendar:

“This course involves lectures and an outreach practicum that aim to develop skills to effectively communicate complex scientific concepts to the public, to interact with news media, and to become effective mentors”.

5.2 Workshops taken in order to further my development in teaching

3. Diversity-oriented Undergraduate Teaching, 2017
2. Impactful Science: Beyond the Classroom, 2016
1. Teaching at the Summit, 2016

6. Future Teaching Goals

My teaching journey is a lifelong one – to teach in a university setting is to fulfill my vocation. I envision myself completing my PhD and then going on to pursue a post-doctoral research position before starting my academic career as an assistant professor.

It is my goal to teach a variety of different university-level chemistry courses. I would like to get experience teaching both small and large courses, predominantly in the field of organic chemistry. I want to use my platform as a teacher in order to influence and inspire the lives of as many students as I possibly can before I retire.

Courses I would be interested in teaching include various strands of organic, biological and pharmaceutical chemistry. As I teach, I would like to integrate unique evaluation methods into chemistry, such as theory-based organic chemistry finals as opposed to problem-based ones. I would also like to integrate different sub-disciplines of chemistry into organic chemistry as I teach it, as I truly believe that each sub-discipline of chemistry plays off of one another in harmony. There is far too much fragmentation in the contemporary curricula... getting beyond this barrier is a future teaching goal of mine.

In future courses which I will teach, I will strive to make difficult concepts relatable to each student. I will use contemporary resources such as websites and active learning classrooms in order to make the most out of the era which I will be teaching in. I will aim to train students to be successful in chemistry by pointing towards contemporary discoveries in the world of chemistry research so as to make the curriculum applicable to the work being done in academic research labs today.

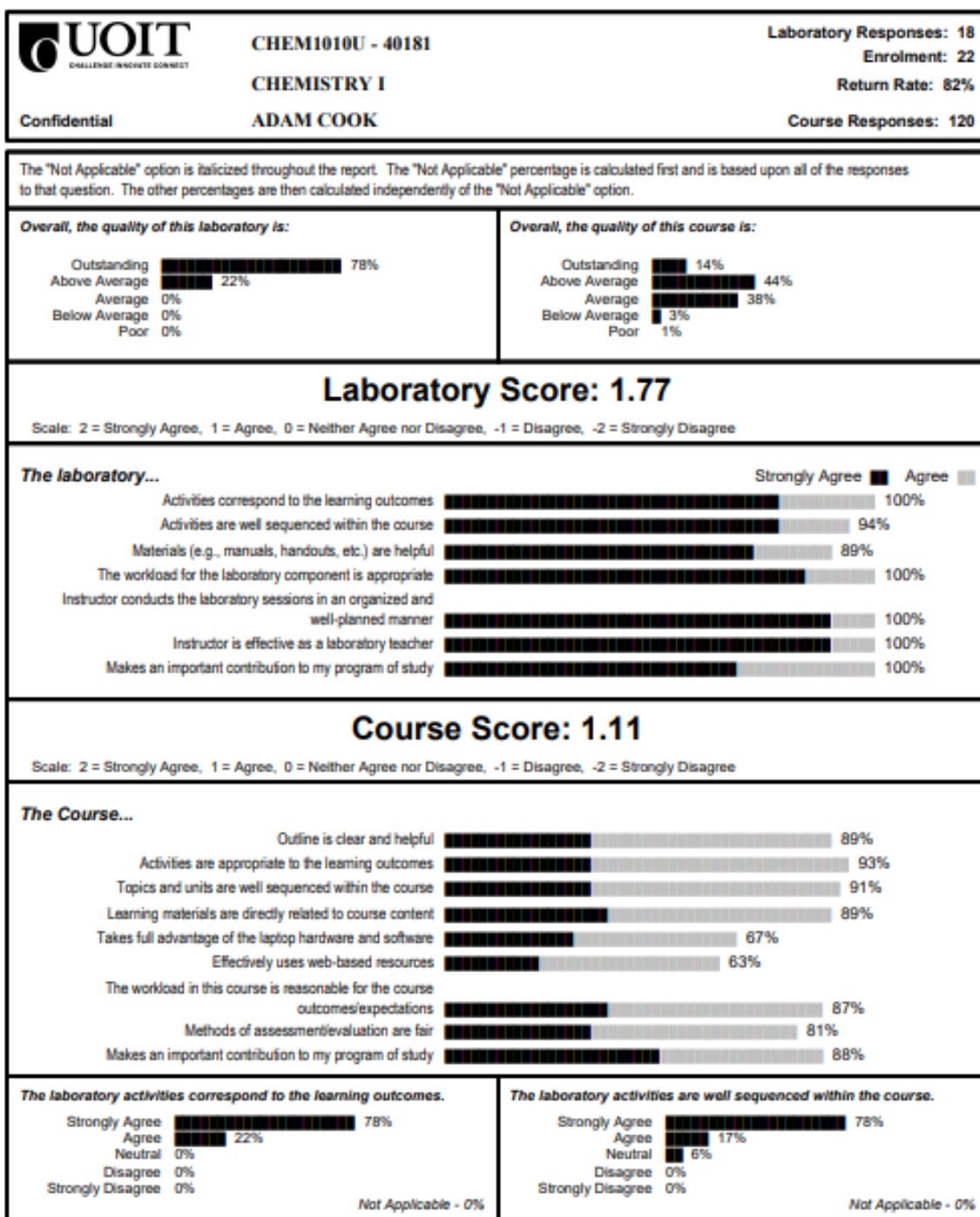
Beyond classroom instruction, I want to mentor as many researchers as I can within a research laboratory. One thing I will strive to do, if I succeed in my goals of running a research team, will be to hire many undergraduate research assistants. In line with my teaching philosophy, I believe that enthusiasm for discovery is very important to academic success and I feel that it is at its greatest when students are young. Research will help further the education of undergraduates as it helps them solidify the concepts which they learn inside of the classroom.

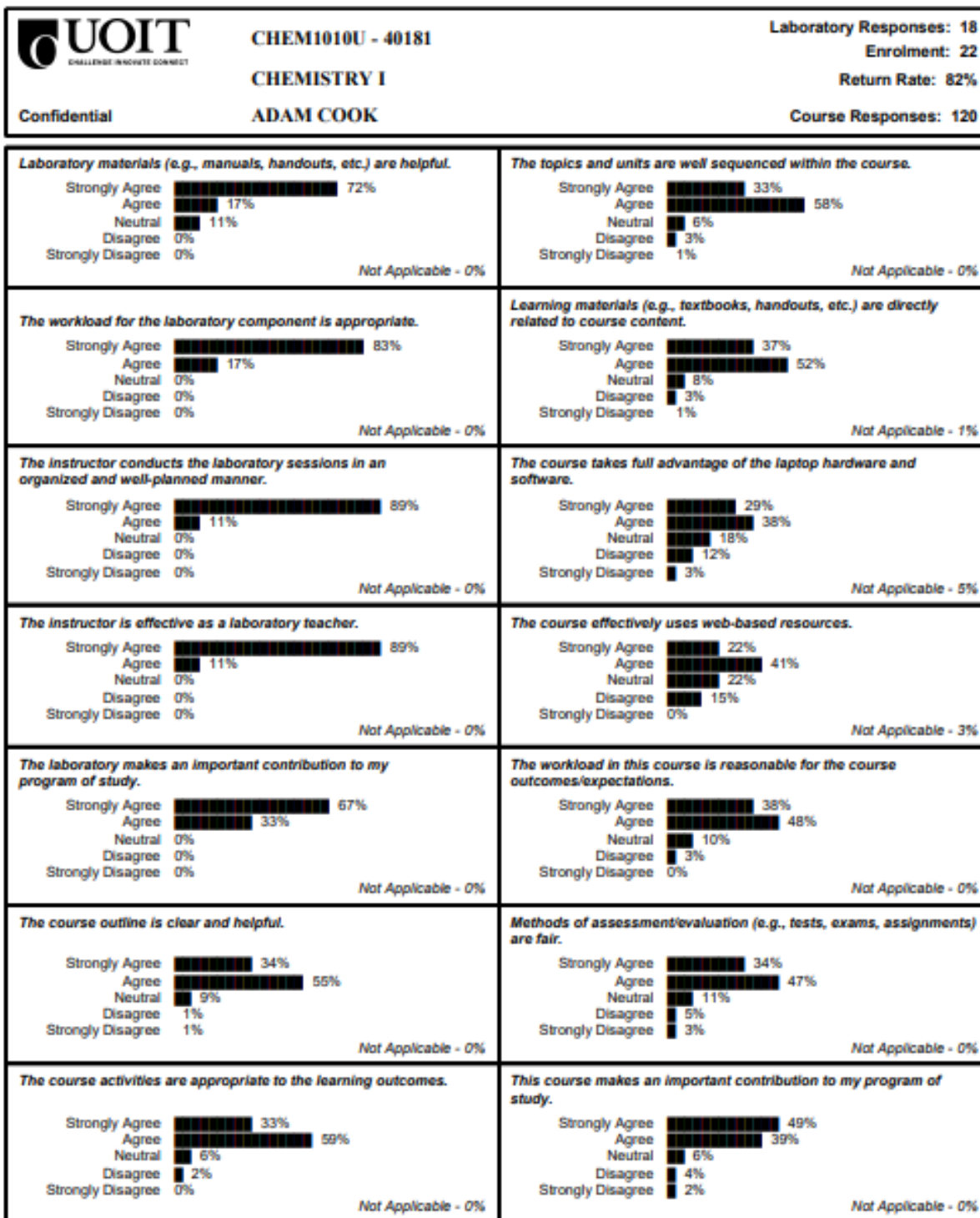
Over the course of my graduate degree and beyond, I will commit to enrolling in as many different teaching-oriented classes and workshops as I can in an attempt to make myself into the best instructor that I can become. Further, I will attend business-oriented workshops in financial management and leadership in an attempt to best prepare myself for a roll as team-leader in a research environment. I believe that by doing that, I will free up as much time as I can for teaching and mentoring students within my research group.

7. Appendix

1. For a description of courses provided at uOttawa, please refer to the course calendar at:
<https://catalogue.uottawa.ca/en/courses/>
2. For a description of courses provided at the University of Ontario Institute of Technology (now rebranded as Ontario Tech University), please refer to the course calendar at:
<https://ontariotechu.ca/current-students/academics/academic-calendars/>

3. Course evaluation, F2016







CHEM1010U - 40181

CHEMISTRY I

ADAM COOK

Laboratory Responses: 18

Enrolment: 22

Return Rate: 82%

Course Responses: 120

Confidential

Comments:

Adam was the best TA I had all first semester! He was kind, easily approachable, nice and had a real interest in what he was teaching us. He gave good feedback, and was a fair marker when it came to work.

Adam Cook clearly explains the lab procedure and conducts the laboratory in a fashion that allows for a deeper understanding of theory behind the laboratories

Adam Cook was an amazing TA. Extremely helpful, always kind, and answers all questions well. He made the labs fun.

Adam was a very sweet TA and was able to deliver the contents of the lab properly. I was able to understand the requirements needed for the lab, and felt comfortable within the class. Adam was very helpful in terms of the lab assignment homework questions and was able to provide us students with the required equations and proper requirements the questions were asking of. Thank you Adam for being the best TA out of all my classes and other TA's combined. You were exceptionally kind and did well as a first time TA. Good luck in the future!


Really nice and helpful. Easily approachable and funny as well. His cheerfulness can wake you up for the 8am lab and can be such a support when you're having a hard time with the lab. The compliments he gives make the uneasiness about numbers fade away. He makes sure you get how to work through the lab questions as well as lab procedures. Overall, he is AMAZING.





























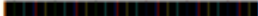








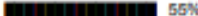

















Adam is an excellent TA and is very helpful during lab sessions.

Adam was an outstanding TA and helped me understand the follow up questions in order for me to achieve a good mark in the labs

adam is very enthusiastic and very enjoyable to learn from

4. Course evaluation, F2016

 CHALLENGE INNOVATE CONNECT	CHEM1010U - 40909 CHEMISTRY I ADAM COOK	Laboratory Responses: 11 Enrolment: 20 Return Rate: 55% Course Responses: 120																		
Confidential																				
The "Not Applicable" option is italicized throughout the report. The "Not Applicable" percentage is calculated first and is based upon all of the responses to that question. The other percentages are then calculated independently of the "Not Applicable" option.																				
Overall, the quality of this laboratory is: Outstanding ██████████ 64% Above Average ██████████ 36% Average ██████████ 0% Below Average ██████████ 0% Poor ██████████ 0%	Overall, the quality of this course is: Outstanding ██████████ 14% Above Average ██████████ 44% Average ██████████ 38% Below Average ██████████ 3% Poor ██████████ 1%																			
<h2 style="margin: 0;">Laboratory Score: 1.82</h2> <p style="margin: 0; font-size: small;">Scale: 2 = Strongly Agree, 1 = Agree, 0 = Neither Agree nor Disagree, -1 = Disagree, -2 = Strongly Disagree</p>																				
The laboratory... <div style="text-align: right; font-size: small;">Strongly Agree ██████ Agree ██████</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Activities correspond to the learning outcomes</td> <td style="text-align: right; padding: 2px;">100%</td> </tr> <tr> <td style="padding: 2px;">Activities are well sequenced within the course</td> <td style="text-align: right; padding: 2px;">100%</td> </tr> <tr> <td style="padding: 2px;">Materials (e.g., manuals, handouts, etc.) are helpful</td> <td style="text-align: right; padding: 2px;">100%</td> </tr> <tr> <td style="padding: 2px;">The workload for the laboratory component is appropriate</td> <td style="text-align: right; padding: 2px;">100%</td> </tr> <tr> <td style="padding: 2px;">Instructor conducts the laboratory sessions in an organized and well-planned manner</td> <td style="text-align: right; padding: 2px;">100%</td> </tr> <tr> <td style="padding: 2px;">Instructor is effective as a laboratory teacher</td> <td style="text-align: right; padding: 2px;">100%</td> </tr> <tr> <td style="padding: 2px;">Makes an important contribution to my program of study</td> <td style="text-align: right; padding: 2px;">100%</td> </tr> </table>			Activities correspond to the learning outcomes	100%	Activities are well sequenced within the course	100%	Materials (e.g., manuals, handouts, etc.) are helpful	100%	The workload for the laboratory component is appropriate	100%	Instructor conducts the laboratory sessions in an organized and well-planned manner	100%	Instructor is effective as a laboratory teacher	100%	Makes an important contribution to my program of study	100%				
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Instructor is effective as a laboratory teacher	100%																			
Makes an important contribution to my program of study	100%																			
<h2 style="margin: 0;">Course Score: 1.11</h2> <p style="margin: 0; font-size: small;">Scale: 2 = Strongly Agree, 1 = Agree, 0 = Neither Agree nor Disagree, -1 = Disagree, -2 = Strongly Disagree</p>																				
The Course... <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Outline is clear and helpful</td> <td style="text-align: right; padding: 2px;">89%</td> </tr> <tr> <td style="padding: 2px;">Activities are appropriate to the learning outcomes</td> <td style="text-align: right; padding: 2px;">93%</td> </tr> <tr> <td style="padding: 2px;">Topics and units are well sequenced within the course</td> <td style="text-align: right; padding: 2px;">91%</td> </tr> <tr> <td style="padding: 2px;">Learning materials are directly related to course content</td> <td style="text-align: right; padding: 2px;">89%</td> </tr> <tr> <td style="padding: 2px;">Takes full advantage of the laptop hardware and software</td> <td style="text-align: right; padding: 2px;">67%</td> </tr> <tr> <td style="padding: 2px;">Effectively uses web-based resources</td> <td style="text-align: right; padding: 2px;">63%</td> </tr> <tr> <td style="padding: 2px;">The workload in this course is reasonable for the course outcomes/expectations</td> <td style="text-align: right; padding: 2px;">87%</td> </tr> <tr> <td style="padding: 2px;">Methods of assessment/evaluation are fair</td> <td style="text-align: right; padding: 2px;">81%</td> </tr> <tr> <td style="padding: 2px;">Makes an important contribution to my program of study</td> <td style="text-align: right; padding: 2px;">88%</td> </tr> </table>			Outline is clear and helpful	89%	Activities are appropriate to the learning outcomes	93%	Topics and units are well sequenced within the course	91%	Learning materials are directly related to course content	89%	Takes full advantage of the laptop hardware and software	67%	Effectively uses web-based resources	63%	The workload in this course is reasonable for the course outcomes/expectations	87%	Methods of assessment/evaluation are fair	81%	Makes an important contribution to my program of study	88%
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The laboratory activities correspond to the learning outcomes. Strongly Agree ██████████ 64% Agree ██████████ 36% Neutral ██████████ 0% Disagree ██████████ 0% Strongly Disagree ██████████ 0% <i>Not Applicable - 0%</i>	The laboratory activities are well sequenced within the course. Strongly Agree ██████████ 73% Agree ██████████ 27% Neutral ██████████ 0% Disagree ██████████ 0% Strongly Disagree ██████████ 0% <i>Not Applicable - 0%</i>																			

 UOIT CHALLENGE INNOVATE CONNECT	CHEM1010U - 40909	Laboratory Responses: 11
		Enrolment: 20
	CHEMISTRY I	Return Rate: 55%
Confidential	ADAM COOK	Course Responses: 120
<hr/>		
Laboratory materials (e.g., manuals, handouts, etc.) are helpful.	The topics and units are well sequenced within the course.	
Strongly Agree  82%	Strongly Agree  33%	
Agree  18%	Agree  58%	
Neutral 0%	Neutral  6%	
Disagree 0%	Disagree  3%	
Strongly Disagree 0%	Strongly Disagree  1%	
Not Applicable - 0%	Not Applicable - 0%	
<hr/>		
The workload for the laboratory component is appropriate.	Learning materials (e.g., textbooks, handouts, etc.) are directly related to course content.	
Strongly Agree  73%	Strongly Agree  37%	
Agree  27%	Agree  52%	
Neutral 0%	Neutral  8%	
Disagree 0%	Disagree  3%	
Strongly Disagree 0%	Strongly Disagree  1%	
Not Applicable - 0%	Not Applicable - 1%	
<hr/>		
The instructor conducts the laboratory sessions in an organized and well-planned manner.	The course takes full advantage of the laptop hardware and software.	
Strongly Agree  91%	Strongly Agree  29%	
Agree  9%	Agree  38%	
Neutral 0%	Neutral  18%	
Disagree 0%	Disagree  12%	
Strongly Disagree 0%	Strongly Disagree  3%	
Not Applicable - 0%	Not Applicable - 5%	
<hr/>		
The instructor is effective as a laboratory teacher.	The course effectively uses web-based resources.	
Strongly Agree  100%	Strongly Agree  22%	
Agree 0%	Agree  41%	
Neutral 0%	Neutral  22%	
Disagree 0%	Disagree  15%	
Strongly Disagree 0%	Strongly Disagree  0%	
Not Applicable - 0%	Not Applicable - 3%	
<hr/>		
The laboratory makes an important contribution to my program of study.	The workload in this course is reasonable for the course outcomes/expectations.	
Strongly Agree  91%	Strongly Agree  38%	
Agree  9%	Agree  48%	
Neutral 0%	Neutral  10%	
Disagree 0%	Disagree  3%	
Strongly Disagree 0%	Strongly Disagree  0%	
Not Applicable - 0%	Not Applicable - 0%	
<hr/>		
The course outline is clear and helpful.	Methods of assessment/evaluation (e.g., tests, exams, assignments) are fair.	
Strongly Agree  34%	Strongly Agree  34%	
Agree  55%	Agree  47%	
Neutral  9%	Neutral  11%	
Disagree  1%	Disagree  5%	
Strongly Disagree  1%	Strongly Disagree  3%	
Not Applicable - 0%	Not Applicable - 0%	
<hr/>		
The course activities are appropriate to the learning outcomes.	This course makes an important contribution to my program of study.	
Strongly Agree  33%	Strongly Agree  49%	
Agree  59%	Agree  39%	
Neutral  6%	Neutral  6%	
Disagree  2%	Disagree  4%	
Strongly Disagree  0%	Strongly Disagree  2%	
Not Applicable - 0%	Not Applicable - 0%	



CHEM1010U - 40909

CHEMISTRY I

ADAM COOK

Laboratory Responses: 11

Enrolment: 20

Return Rate: 55%

Course Responses: 120

Confidential

Comments:

Adam always make sure everyone understands what the lab is about and will help anyone who looks like they are struggling. He makes sure to let us know what he will be evaluating before the lab starts and does a thorough demonstration of the lab each time.

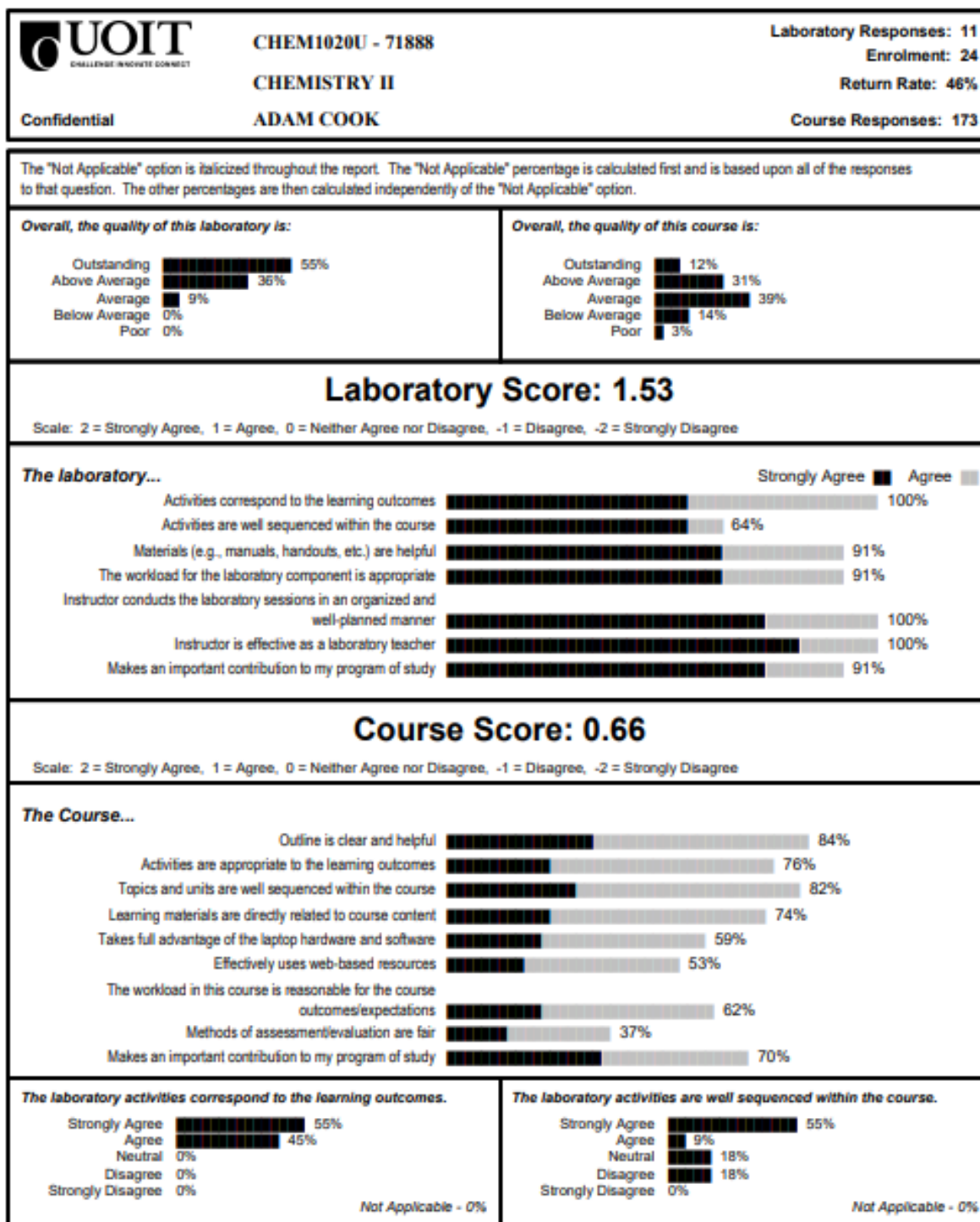
Adam is great! He saved my friend's life in an emergency (don't worry - she just cut her hand and fainted, he handled it really well)

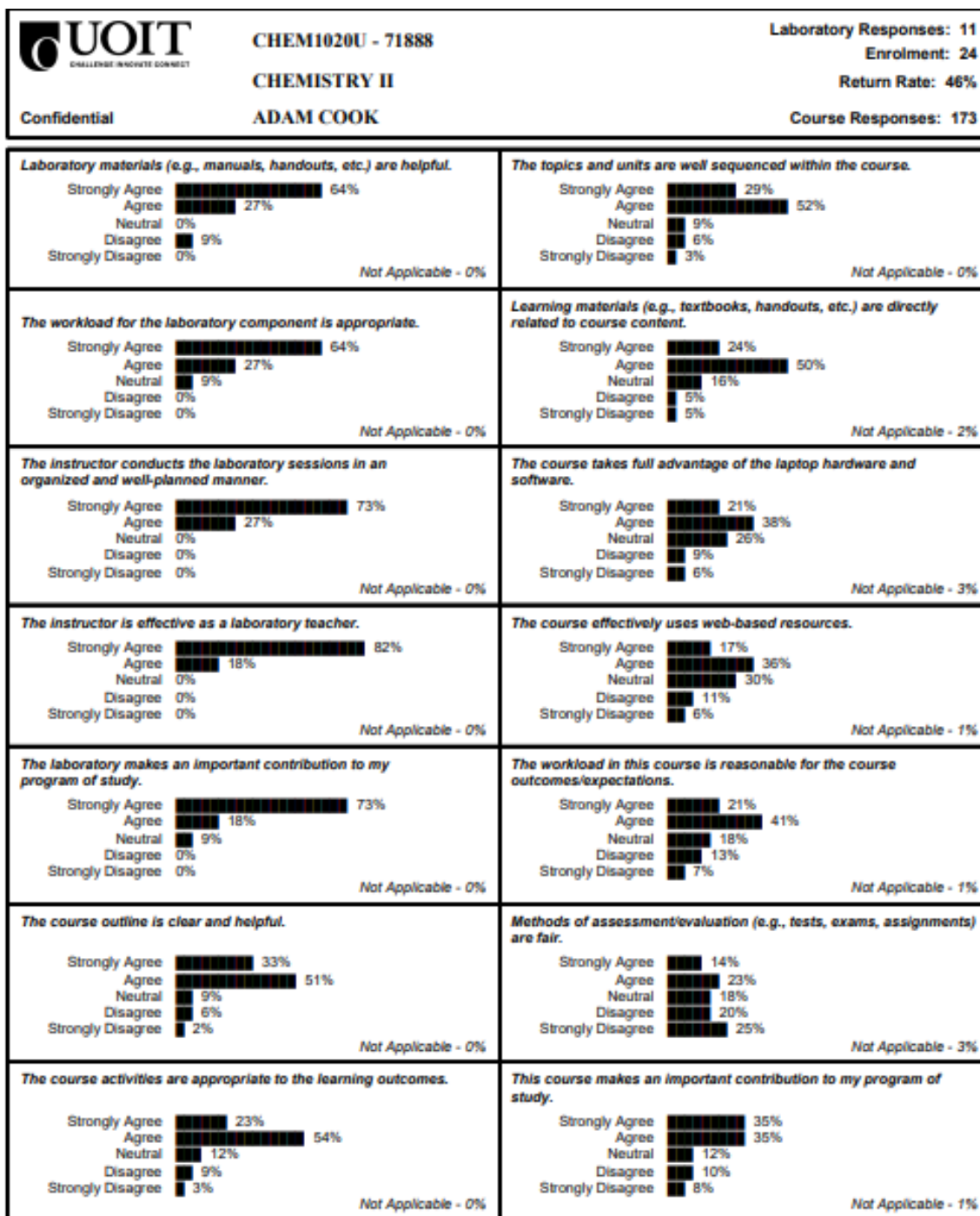
Best TA I have!

Best TA

Adam is an excellent TA. He is very helpful and approachable.

5. Course evaluation, W2017







CHEM1020U - 71888

CHEMISTRY II

ADAM COOK

Laboratory Responses: 11

Enrolment: 24

Return Rate: 46%

Course Responses: 173

Confidential

Comments:

Adam is a very enthusiastic TA, he always helps out with the lab assignments by giving us hints on the board near the end of the lab. The hints are really helpful (he doesn't give us the answer though, just guides us toward it), and help me to understand the questions more thoroughly. The only downside is that he takes about 30 minutes for the introduction of the lab from slowly getting off topic.

The most fun and knowledgeable TA for Labs.

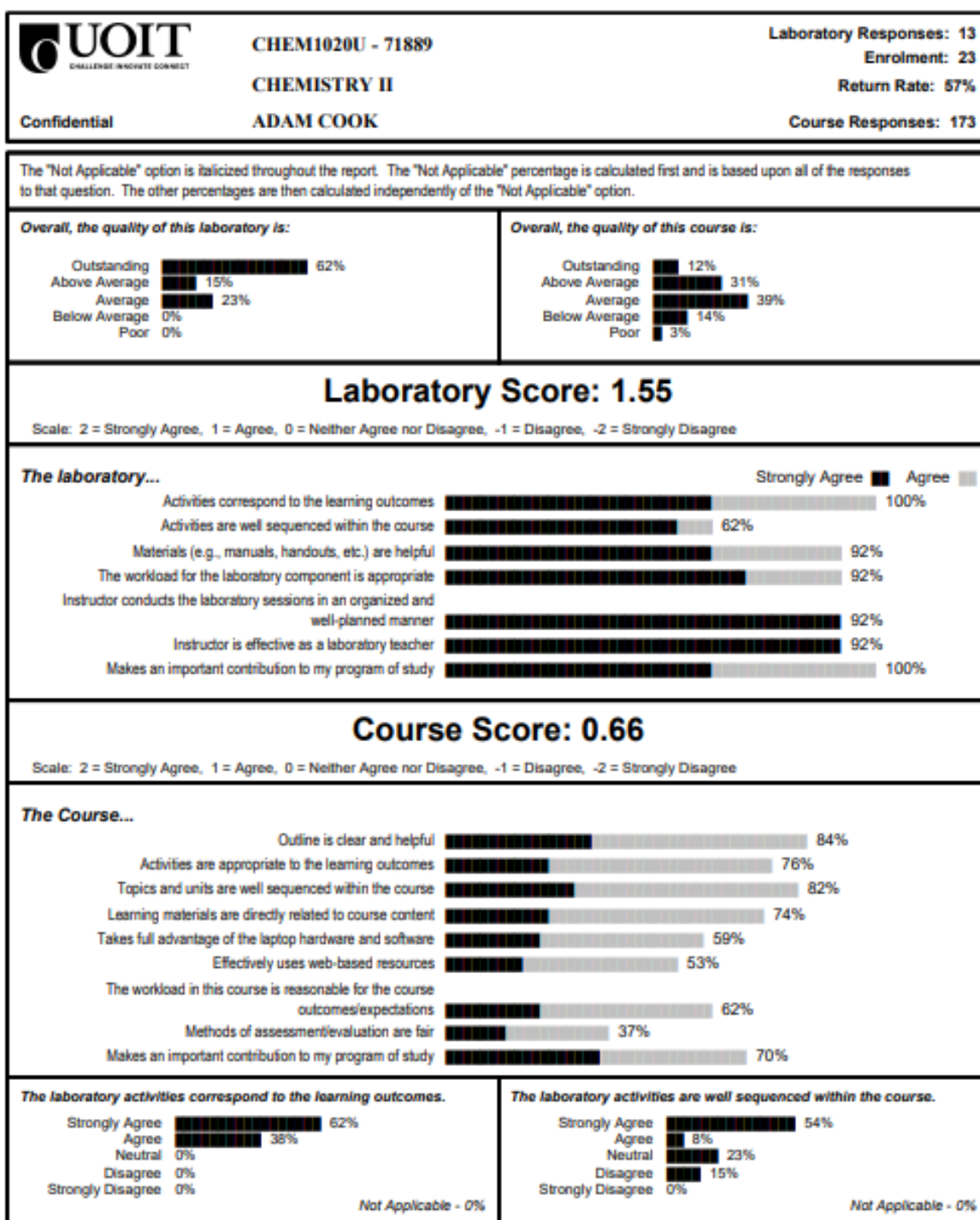
Wish that some lab reports were easier shorter

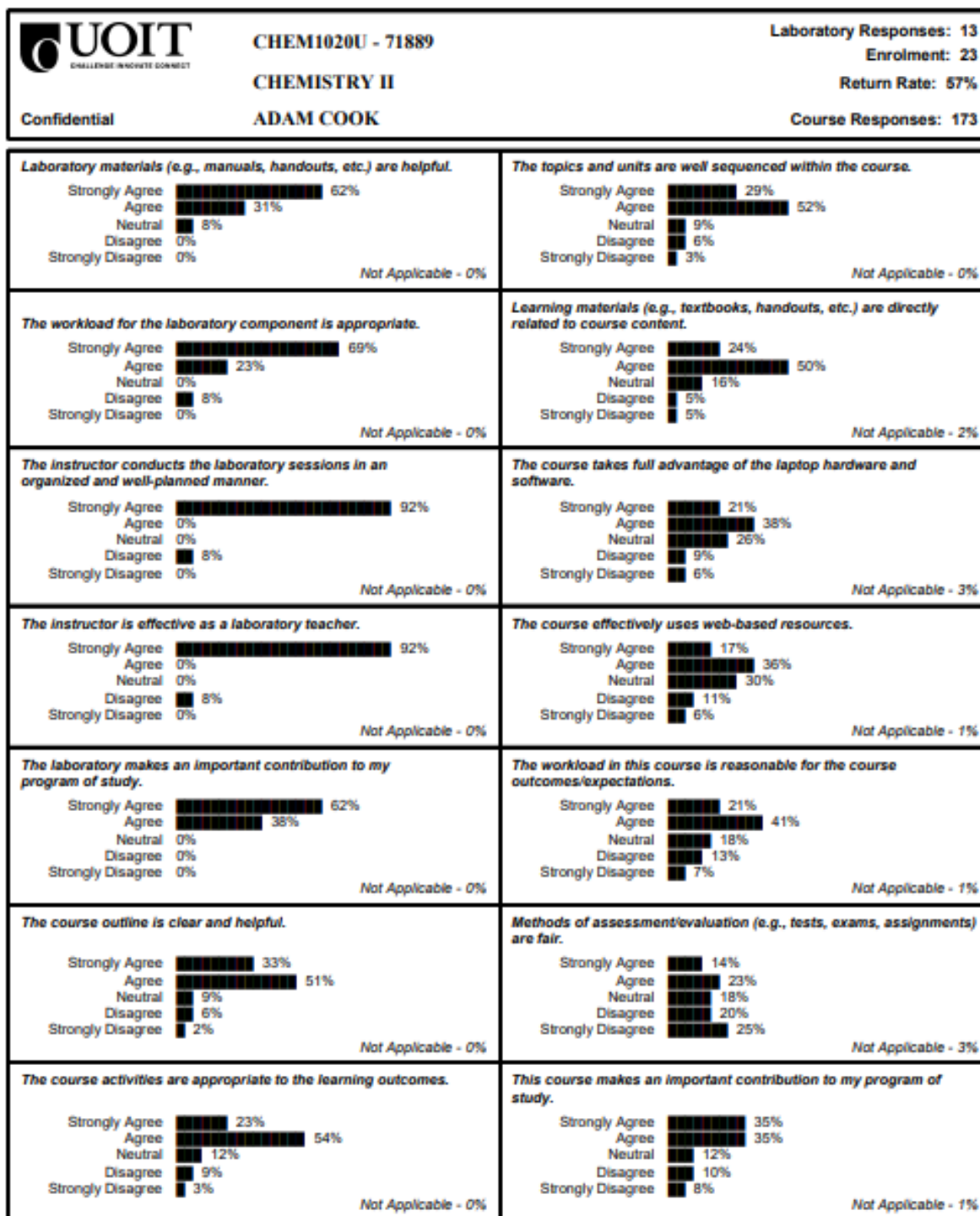
Adam Cook is one of the best T.A's I have ever had. He assists students whenever needed, and does so in a well organized and effective behaviour. He helps me to enjoy my chemistry labs.


By far, the best TA on campus and an asset to the university! Goes out of his way to help students succeed! We need more TA's like Adam for our courses:)

My boy Adam, such a great guy and a TA. Always so helpful, is never stuck up or rude. Has a personality is not dead or sassy like some other TAs. He knows his stuff, runs his lab smoothly. All the best to him. The lab manuals could be more concise, some wording is too confusing.

6. Course evaluation, W2017





 Confidential	CHEM1020U - 71889	Laboratory Responses: 13
	CHEMISTRY II	Enrolment: 23
	ADAM COOK	Return Rate: 57%
		Course Responses: 173

Comments:

Feel very comfortable to ask questions in the lab environment!

The labs were conducted in a fair manner, but the TA was very hard to schedule time with to meet during office hours. I was canceled on both times I emailed for extra help from him, but he did offer to help through email.

I found that the labs themselves were sequenced so that the labs were done before the content was taught which made it very difficult for me to do the lab questions. I also found the lab questions to be very advanced and I needed a lot of extra help and a lot of time to complete them. Doing the labs was usually fast and I had all the skills required to complete each part and found them enjoyable. Adam is an awesome TA. He was very helpful during the lab and always wrote lab help on the board which made a huge difference to my lab write up and lab marks. Thanks Adam for being so great!

Adam is an outstanding TA! Very effective in both knowledge and style.

Adam is a great TA because he is super chill and makes the lab feel fun instead of stressful. He makes me want to actually come to the lab instead of sleep :)

7. Kevin's reference letter

To: Chair of Chemistry, U. of Ottawa

Oct 2019

Re: Reference Letter for Adam Cook - 300097188 Keith Fagnou Memorial Scholarship

From: Dr. Kevin Coulter, Faculty of Science, UOIT

Dear Sir or Madame,

Please accept this letter of reference in support of U. of Ottawa graduate student Adam Cook's application to the Keith Fagnou Memorial Scholarship. I am an Associate Teaching Professor and snr. lab instructor of organic and inorganic chemistry at Ontario Tech University (formerly UOIT), and got to know Adam very well while in the 3rd and 4th year of his undergraduate chemistry program. In particular, Adam had volunteered with me and had worked for me as a lab assistant developing a "Solar Fuels Research" after school activity for high school students, which allowed me to get to know him well.

Adam's academic performance was outstanding, both in lectures and the lab. As evidenced by his academic record, Adam was a dedicated high-achieving student with a high GPA and consistently making the Dean's list and President's list. He has strong interest and enthusiasm for understanding chemical phenomena and discussing chemistry in general. He learns quickly and is well able to assimilate chemical knowledge and apply it. He is free-thinking and creative which will serve well in a graduate research project.

He has strong lab skills and performs lab work and chemical techniques very well; he was typically the first student to complete the lab, often needing far less time than the average students. He also has a strong work ethic, exceptional organization skills, and common sense which will allow him to perform well in a research lab. Most importantly, Adam has a strong interest in "doing chemistry" and achieving meaningful results, as exemplified by his participation in a summer research student exchange program where he went to Cardiff University, and by a quote from our chemistry lab technician: "that guy is going places".

Adam has a very enthusiastic personality and professional demeanor; he is well respected and very respectful of others. He is very friendly and outgoing, and has great interpersonal skills, he can work well individually or in collaboration with other research group members. Adam must have great time management skills because he did a lot of extra work outside of his course work, which included volunteering as a speaker for our High School Science day talks, as an assistant for our Open House chemistry demonstrations, and leading my "Solar Fuels Research" after school activity mentoring top high school students; Adam has a unique engaging and entertaining style of explaining chemistry to students which will serve him well as Teaching Assistant and lecturer in future years.

Sincerely,
Kevin Coulter

Kevin Coulter Ph.D. (Associate Teaching Professor)
Faculty of Science, Chemistry
Ontario Tech University

8. Sample course syllabus

Chemistry through the ages: From magic to modernity**CHM 4070****Lecture schedule**

Monday	11:10 – 12:30	DRO 214
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Thursday	11:10 – 12:30	DRO 214
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Lab schedule

Friday	8:10 – 11:00am	MRN 301
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Course/Lab instructor

Adam Cook

MSc student, Department of Chemistry and Biomolecular Sciences, Faculty of Science, uOttawa.

office: BSC 435 (office hours available upon request!)

email: acook093@uottawa.ca**Note from the instructor***Hi, all!**Welcome to CHEM 4070!*

I will be acting as your instructor for both the lecture and laboratory components of this course. As this course is geared towards individuals of numerous academic backgrounds, I do not expect many of us to have the same schedule! Thus, I will not be scheduling formal office hours – if you would like to see me, please request a meeting over email. Alternatively, please come visit me at my office... I am always looking for a good conversation!

Over the course of this term, I will strive to answer your emails as quickly as possible. With that being said, I will likely not answer any emails received on weekends, holidays or within 6 hours of any formal evaluation.

Looking forward to growing and learning with you all over the duration of this term! See you Monday, September 8th in DRO 214!

Adam Cook

Course description

This course will consist of two in-person 80-minute lectures per week (23 lectures + reading week); plus, a biweekly three-hour lab session (for a total of 6 laboratory sessions).

CHEM 4070 is a course centered around the development of the discipline of chemistry, tracking its growth from prehistory to modernity. Over the course of this term, you'll become acquainted with each of the key figures – as well as their contributions – who have played a role in the construction of chemistry as it stands today. By taking a “key snapshots” approach to chemistry, we will examine its state at different points throughout history in hopes that we may gain a deeper understanding and appreciation for the work that set the stage for the lives that we live today.

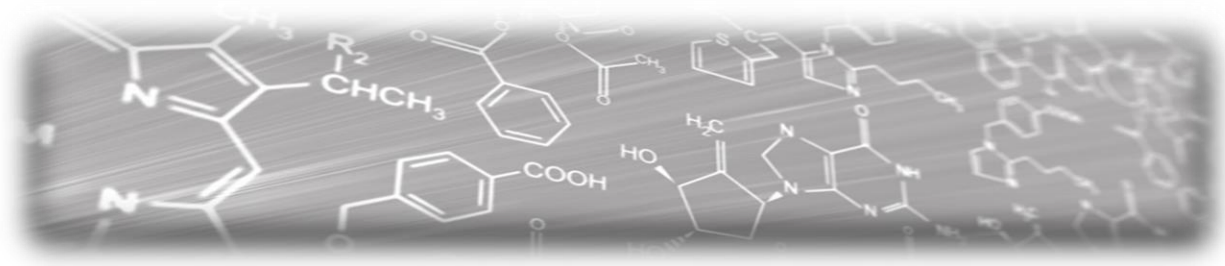
Pre-requisites

Students must have taken **CHM 1411 – Intro to organic chemistry** as well as **CHM 2411 – Fundamental Organic Chemistry** in order to enroll in this class.

Course outcomes

This course is targeted towards upper-year undergraduate and graduate-level students, with an expected enrollment of 20-30 students. This course will be predominantly theory-based, affording stark contrast to typical contemporary upper-year chemistry courses that dwell on practical experimentation and problem solving (such as computational chemistry, quantum chemistry and pharmaceutical discovery). Rather than teaching students how to perform chemistry, this course will focus on the discipline as a whole as it strives to elucidate details that may be glanced over in the contemporary chemistry curriculum.

In chemistry, there's SO much to remember and SO much to learn. With the focus predominantly being on the practical nature of the craft, little attention is paid towards the facts of the discipline – who discovered what, and what went into these discoveries. Who discovered the reaction mechanism? Where did the idea of functional groups come from? Who are the best contemporary chemists, and who are the best chemists of the past? These are all questions that are not addressed in the modern undergraduate curriculum – yet they are questions that all chemists are expected to know the answer for. This course will aim to “fill in the blanks” that are left unfilled in the modern curriculum – this class will teach the information that chemists are supposed to know but are never explicitly taught.



Learning outcomes

By the end of this course, it is hoped that each student will be able to...

General learning outcomes

- Identify and assess the impact of the key developments, figures and experiments throughout history that occupy pivotal points along the timeline of chemistry
- Recognize and dissect the many ways that the perspectives of chemists – and in turn society – have evolved throughout history.
- Recognize parallels between the development of chemistry and the development of society
- Imagine the ways that chemistry may evolve in the future.

Specific learning outcomes

- Examine the development of the reaction mechanism, from ancient history through its role in the chemistry world today
- Examine the birth, flourishing and decay of “total synthesis”
- Examine ‘gaps’ in the history of chemistry, identifying missing sources and times where ideas strayed far from reality
- Recreate key experiments from history

Teaching approach

This course has been designed according to my personal teaching philosophy – in that I hope to create a fun, enthusiastic classroom environment as I believe this atmosphere is one which will promote the best learning. I will strive to teach above and beyond “just chemistry”, and hope that through taking this course you will be able to apply some of the concepts learned towards your every-day life. While the tentative class schedule can be found on Page 5 of this document, this course will be predominantly student driven – it is my philosophy to teach towards the stuff that you, as my students, want to learn about. The topics of two classes (November 23 & November 26) will actually be chosen by you! I will aim to stress a theory-based course – expect to write paragraphs on an examination rather than to do calculations. Further, examinations will be written in a way that minimizes failures while still challenging students if they want to score an A+. A key theme of my teaching style is the “sports coach philosophy” – rather than being simply an instructor teaching a group of students about chemistry, I will aim to be the coach of a *team* of students with the aim of turning my *team* into the best chemists that they can be!

Recommended learning material

There are many works of literature that may help to supplement your knowledge and gear you towards success in this course. While no reading materials are mandatory, these two textbooks may help you to further understand the concepts spoken about in this course

- *The Way of Synthesis* – Hudlicky & Reed – **2007**

- *Organic Chemistry* – Clayden, Greeves, Warren & Wothers – **2000**

Further, many papers on the history of chemistry have been featured in chemistry journals over the years. I certainly recommend the following papers, written by Prof. Jeffery Seemen at the University of Rochford:

- "Gilbert Stork: In his Own Words and in the Musings of his Friends," *Angew. Chem. Int. Ed.*, **2012**, 51, 3012-3023.
- "R. B. Woodward, A Great Physical Organic Chemist," *J. Phys. Org. Chem.*, **2014**, 27, 708-72.
- "R. B. Woodward: A Larger Than Life Chemistry Rock Star," *Angew. Chemie. Int. Ed.* **2017**, 56, 10228-10245.
- "Carl Djerassi's Search For Home. At 90, Highly Celebrated Chemist and Author Has a Burning Quest to Belong," *Chemical & Engineering News*, **2013**, 91 (October 21), Front Cover, 10-11, 13-14.
- "Moving Beyond Insularity in the History, Philosophy, and Sociology of Chemistry," *Found. Chem.*, **2017**.

Finally, Wikipedia is your friend for this course! All information is discussable information, and given the broad scope of subject matter I am always open for ideas as to what can/should be added or removed from the course outline!

Course work and evaluation

The grading break-down for this course is as follows...

- Lab reports **(20%)**: Six lab reports are to be submitted over the course of the term. Each report is to be submitted no later than 2 weeks after the performance of each individual laboratory. Please refer to the course calendar for further details regarding exact due dates.
- Term paper **(15%)**: Each student is to complete one 4000-word paper based on a topic related to the historical development of chemistry as a discipline. This assignment is to be submitted no later than December 2nd.
- Timeline **(15%)**: Each student is to complete a timeline containing what they feel to be the ten most significant events in the history of chemistry. This assignment is to be submitted no later than December 10th.
- Final exam **(50%)**: Students will write a cumulative, closed-book exam at the end of the term. Tentative exam date is December 10th.

Course Calendar

Week	Date	Topic
1	Sept. 8 Sept. 11	- Course introduction - Planetary and prehistoric chemistry
2	Sept. 15 Sept. 18	- Chemistry in Ancient Egypt: The magical origins - Chemistry in Ancient Egypt: From magic to medicine
3	Sept. 22 Sept. 25	- Chemistry in Ancient Greece - Chemistry in Ancient Rome
4	Sept. 29 Oct. 2	- Chemistry in the early middle ages: Europe - Chemistry in the early middle ages: Global
5	Oct. 5 Oct. 8	- Western Alchemy - Eastern Alchemy
6	Oct. 12 Oct. 15	- From alchemy to chemistry: The 17 th Century - Early beginnings of chemistry: The 18 th Century
7	Oct. 19 Oct. 22	READING WEEK
8	Oct. 26 Oct. 29	- Chemistry in the 19 th century - Paracelsus and the birth of modern medicine
9	Nov. 2 Nov. 5	- 20 th century chemistry: The grand schism (Two-part lecture) - The split from chemistry into its various subdisciplines
10	Nov. 9 Nov. 12	- 20 th century chemistry: Organic chemistry and the reaction mechanism - 20 th century chemistry: Most important chemists and their work
11	Nov. 16 Nov. 19	- 21 st century chemistry: The turn to modernity - Contemporary chemistry: Biggest topics in chemistry today
12	Nov. 23 Nov. 26	- Student chosen topic (two lectures) *
13	Nov. 30 Dec. 3	- Perspectives on the future of chemistry - Course review and exam preparation

**On October 26th, students will be asked to vote on a topic to be taught during the classes on November 23rd and November 26th.*

*** The schedule for the laboratory sessions will be presented in a different document, to be made available within the first week of classes.*

Attendance

While not mandatory, attendance to the lecture component of this course is very strongly encouraged.

It is mandatory to attend all of the laboratory sessions – students who are unable to make it to one of their lab sessions must inform me via email so that the lab may be rescheduled. If a student misses 2 or more lab sessions, then they will not be eligible to pass this course (*unless special permission is granted from either me or the department!*).

Commitment

As your instructor, you can expect me to...

- Attend every class and arrive on time.
- Come to class with a good attitude
- Be respectful of your ideas and value the diversity you bring to the classroom
- Be open to dialogue that challenges me
- Answer any appropriate questions you may have
- Use a variety of teaching techniques and modalities to accommodate different learning styles
- Return written assignments in class and online in a timely fashion and provide helpful feedback

In return, I expect each of my students to...

- Attend every class and arrive on time, prepared to learn
- Be respectful of the ideas of myself and classmates, value the diversity within the classroom
- Participate actively in class
- Be open to dialogue that challenges them
- Ask any and all appropriate questions that come to mind
- Submit all assignments in in a timely fashion

Effective study habits

Three key practices will lead you towards success in this course. *For more tips, or elaboration upon these points, I **STONGLY** recommend you come by my office!*

- 1) Attendance
- 2) Confidence
- 3) Time management

Campus resources

This course carries with it a heavy writing component. Thus, it is important to pay attention to this component – should assistance be required, the Academic Writing Help Centre will be glad to help.

<https://sass.uottawa.ca/en/writing>

Academic integrity

Plagiarism is a form of academic fraud. Any student found guilty of plagiarism will be subject to sanctions ranging from receiving a mark of F for the work concerned to expulsion from the University of Ottawa and even the revocation of a grade, diploma or certificate. For further information on what constitutes plagiarism in this course and how to avoid it, consult the following file at:

<https://www.uottawa.ca/vice-president-academic/sites/www.uottawa.ca.vice-presidentacademic/files/academic-integrity-students-guide.pdf>

Accessibility

The University of Ottawa offers multiple services to help students succeed in their program of study. For more information, consult the Student Academic Success Service (SASS) website at: www.sass.uOttawa.ca

Access Service offers a support program for students experiencing difficulties due to health, psychiatric or physical conditions and/or learning disabilities. If you require adaptive assistance, please make an appointment to meet with an Access Service specialist.

- In person: UCU 339
- By phone: 613.562.5976
- By email: adapt@uOttawa.ca
- Or online: <https://sass.uottawa.ca/en/access>