

## Chem 156 Schedule and Syllabus (2014)

Professor: Dr. Erich Uffelman (office: A427, x8040)

ARTH 356 (Spring term; 4 credits; HA FDR) involves a survey of 17th century Dutch history, art history, etc., which links the scientific analysis to the art and culture of the time. The winter term course (CHEM 156) involving primarily the scientific and technical background will be taught on campus at W&L. The second four weeks (ARTH 356) involving art and culture, will be taught at the Center for European Studies (CES) Universiteit Maastricht.

In the Netherlands, students will have the opportunity to visit the major art museums of The Netherlands and to see the significant conservation laboratories and training facilities. Trips to the following locations will transpire: The Rijksmuseum (Amsterdam), the Amsterdams Historisch Museum (Amsterdam), The Frans Hals Museum and Conservation Lab (Haarlem), the Grote Kerk St. Bavo (Haarlem), the Gemeente Museum (The Hague), Stedelijk Museum Het Prinzenhof (Delft), the Oude Kerk and Nieuwe Kerk (Delft), Boijmans van Beuningen Museum (Rotterdam), Bonnefanten Museum (Maastricht), Stichting Restauratie Atelier Limburg (Maastricht), Basilica of St. Servatius (Maastricht), and the Basilica of Our Lady (Maastricht), Sint Janskerk (Maastricht). The language of instruction at CES Maastricht is English. The Dutch are typically fluent in several languages including English, so students will not have to learn a foreign language to participate in the program. However, students will be expected to learn key phrases in Dutch as a matter of courtesy to citizens of the host country, and students will be expected to be sensitive and polite regarding the manners and customs of The Netherlands.

NOTE! This is a course for BOTH science and non-science majors, and all students are welcome, regardless of background! Dr. Uffelman has significant experience with this course integrating both types of students. Also, the pre-requisite course in the winter will be scheduled so as to minimize the conflicts of interested students. This could be a very good course (with some helpful review components) for students taking the MCAT.

Cost estimate (not counting air fare from students' homes to The Netherlands and back) ~\$4000. Firm budget will be in hand by the beginning of October.

Pre-Requisite: Pre-requisite: CHEM 156 (Winter term; 3 credits; SC FDR) Permission of the instructor required.

All Uffelman Chem 156 lecture classes meet from 7:00 pm to 10:10 pm in Science Center Room G14 on **Wednesday evenings**. It is ESSENTIAL that you be in class on time (i.e., not coming in the door at 7:00, but being in your seat, coat off, writing utensils ready, etc., by 7:00). Punctuality is huge in The Netherlands, and we will be practicing it rigorously in Chem 156 as preparation.

Due **January 7** at 5:00 pm reading as follows: I have put three copies of the 6<sup>th</sup> edition of Kotz, Treichel, and Weaver "Chemistry & Chemical Reactivity" and three copies of the 7<sup>th</sup> edition of Kotz, Treichel, and Townsend "Chemistry & Chemical Reactivity" on reserve in the Science Library. Please read pages 12-40, 60-88, and 1110-1132 from the 6<sup>th</sup> edition twice and jot or type some questions you have (I'll want an electronic copy of your questions.) **OR** please read pages 7-19, 24-34, 50-88, and 1060-1084 from the 7<sup>th</sup> edition twice and jot or type some

questions you have (I'll want an electronic copy of your questions.) **OR** some of you own the 8<sup>th</sup> edition of the book from Chem 110 Kotz, Treichel, and Townsend "Chemistry & Chemical Reactivity; if so, please read pages 6-16, 24-35, 50-85, and 1058-1082 from the 8<sup>th</sup> edition twice and jot or type some questions you have (I'll want an electronic copy of your questions.).

Also due **January 7** at 5:00 pm is your electronic copy of definitions and terms (see assignment; i.e., **homework 1**).

- January 8: Lecture 1---Nuclear chemistry, neutron activation autoradiography, death of painting

Due **January 14** at 5:00 pm: Your journal entry for Lecture 1; your homework from Lecture 1 (i.e., **homework 2**); your reading report for PS Zero (on Sakai); your reading report for Bob Haak "The Golden Age: Dutch Painters of the 17<sup>th</sup> Century" pages 11-77 (on reserve in the Science Library); your progress report on your first research topic.

- January 15: Lecture 2---Death of painting, basic math and optics

Due **January 21** at 5:00 pm: Your journal entry for Lecture 2; your homework from Lecture 2 (i.e., **homework 3**); your reading report for Bob Haak "The Golden Age: Dutch Painters of the 17<sup>th</sup> Century" pages 77-161 (on reserve in the Science Library); your progress report on your first research topic.

- January 22: Lecture 3---Basic math and optics, Overview of Dutch painting

Due **January 28** at 5:00 pm: Your journal entry for Lecture 3; your homework from Lecture 3 (i.e., **homework 4**); your reading report for EITHER Kotz&Treichel&Weaver 6<sup>th</sup> ed chapter 7 OR Kotz&Treichel&Townsend 7<sup>th</sup> ed chapter 6 OR Kotz&Treichel&Townsend 8<sup>th</sup> ed chapter 6; your progress report on your first research topic.

- January 29: Lecture 4---More optics, wave-particle photon and electron, overview of Dutch painting

January 30-February 4: **Breakout mini-lab experience**. In groups of 5-6 you will spend approximately two hours with Dr. Uffelman getting hands-on experience with basic optics equipment

Due **February 4** at 5:00 pm: Your journal entry for Lecture 4; your homework from Lecture 4 (i.e., **homework 5**); your reading report for EITHER Kotz&Treichel&Weaver 6<sup>th</sup> ed chapter 8 OR Kotz&Treichel&Townsend 7<sup>th</sup> ed chapter 7 OR Kotz&Treichel&Townsend 8<sup>th</sup> ed chapter 7; an outline of your first research talk; your progress report on your second research topic.

- February 5: Lecture 5---Wave-particle photon and electron, Schrodinger and orbitals, electron configurations and periodicity, overview of Dutch painting

Due **February 11** at 5:00 pm: Your journal entry for Lecture 5; your homework from Lecture 5 (i.e., **homework 6**); your reading report for EITHER Kotz&Treichel&Weaver 6<sup>th</sup> ed chapter 9 OR

Kotz&Treichel&Townsend 7<sup>th</sup> ed chapter 8 OR Kotz&Treichel&Townsend 8<sup>th</sup> ed chapter 8; your progress report on your first research talk; your progress report on your second research topic.

- February 12: Lecture 6---electron configurations and periodicity, Covalent bonding and Lewis dot structures, overview of Dutch painting

**Take home test 1 due Friday, February 14 at 5:00 pm (just before break starts); if you need to, and be nicely, I will permit you to send it to me electronically on Monday, February 17 at noon.**

Due **February 25** at 5:00 pm: Your journal entry for Lecture 6; your homework from Lecture 6 (i.e., **homework 7**); your reading report for EITHER Kotz&Treichel&Weaver 6<sup>th</sup> ed chapter 10 OR Kotz&Treichel&Townsend 7<sup>th</sup> ed chapter 9 OR Kotz&Treichel&Townsend 8<sup>th</sup> ed chapter 9; your progress report on your first research talk; your progress report on your second research topic.

- February 26: Lecture 7---VB and MO theory, X-rays and their applications,

February 27- March 4: **Breakout mini-lab experience.** In groups of 5-6 you will spend approximately two hours with Dr. Uffelman getting hands-on experience with polarized light microscope applications and SEM-EDS

Due **March 4** at 5:00 pm: Your journal entry for Lecture 7; your homework from Lecture 7 (i.e., **homework 8**); your reading report on “Scientific Examination for the Investigation of Paintings: A Handbook for Restorers” pages 11-50; a draft of your first research talk; your progress report on your second research topic.

- March 5: Lecture 8---IR reflectography; SEM, ESEM, vibrational methods, UV-vis and microscopy

Due **March 11** at 5:00 pm: Your journal entry for Lecture 8; your homework from Lecture 8 (i.e., **homework 9**); your reading report on “Scientific Examination for the Investigation of Paintings: A Handbook for Restorers” pages 50-112; your progress report on your first research talk; your progress report on your second research topic.

- March 12: Lecture 9---GC-MS, SIMS, copper as canvas,

March 13-March 18: **Breakout mini-lab experience.** In groups of 5-6 you will spend approximately two hours with Dr. Uffelman getting hands-on experience with pXRF, IR imaging, and FORS applications

Due **March 18** at 5:00 pm: Your journal entry for Lecture 9; your homework from Lecture 9 (i.e., **homework 10**); your reading report on Margriet van Eikema Hommes “Changing Pictures: Discoloration in 15<sup>th</sup>-17<sup>th</sup>-century Oil Paintings” pages 1-43; the final draft of your first research talk; your progress report on your second research topic.

- March 19: Lecture 10---Dutch history part I, Dutch history part II, Dutch wars with Spain, Dutch wars with England, Dutch economy, Dutch religion [NOTE: These are student research presentations!]

Due **March 25** at 5:00 pm: Your journal entry for Lecture 10; an outline of your second research talk

- March 26: Lecture 11--- VOC, Dutch West India Company, Dutch fashion, Dutch women in art, Neuroscience of vision & Visual intelligence, Trompe l'oeil [NOTE: These are student research presentations!]

**Take home test 2 due Friday, March 28 at 5:00 pm (just before last week of classes); if you need to, and beg nicely, I will permit you to send it to me electronically on Saturday, March 29 at 5:00 pm.**

Due **April 1** at 5:00 pm: Your journal entry for Lecture 11; your progress report on your second research topic; **homework 11**

- April 2: Lecture 12---Hockney vs Stork, Steadman vs Stork, Computer analysis of art, Art Theft, WWII art repatriation, Han van Meegeren ["Tim's Vermeer" critique?] [NOTE: These are student research presentations!]

**APRIL 5, Saturday morning, 10 am-noon: MANDATORY meeting for everyone in Chem 156 who is going to The Netherlands!!!!!!!!!!!!**

Due **April 8** at 5:00 pm: Your journal entry for Lecture 12; a draft of your second research talk (you will probably want to talk to me about your second research talk before leaving for break)

**Chem 156 Concluded!**

**[FIRST ARTH 356 ASSIGNMENT: Test on student presentations in Chem 156 due Monday, April 21 at 12:01 am as part of ARTH 356 grade.]**

You will need the following materials:

1. **3-ring notebooks** are needed for keeping your printouts of the lecture notes. It is your responsibility to obtain all these pages *as they are issued* and to maintain a complete set during the course.
2. For computations you need to have (and to know how to use) a **personal hand-calculator**. NOTE: it should have functional keys for *exponential* ( $10^x$  and  $e^x$ ), *logarithmic* (log and ln), and *trigonometric* (sin, cos, etc.) functions. Read-outs should express answers in *exponential form* (e.g.,  $3.542 \times 10^{-3}$ ). Certain inexpensive models have ALL of these features, but some expensive models DO NOT!

3. Access to the **Chemistry 156 Sakai site** (<http://sakai.wlu.edu>). Here you can access course materials not given to you in class, and we will probably use this site to communicate some communally needed information. Your regular login should work. It is essential that you verify ASAP that your access to this site is functional.
4. A **materials fee** will be charged to your W&L Account near the end of the term. This fee covers the course hand-out materials and shared book costs. If you have any financial aid concerns about this fee, or other questions, please contact us. Note, you will be charged only the actual costs of the materials to the professor and to the Department--no profit is made from these materials.

### TESTS

There are two big take home tests scheduled during the term. They are not to be turned in late for any reason other than catastrophic prolonged illness or other catastrophes (e.g., massive earthquake, tornado, meteor strike, etc.). Failure to turn them in on time can result in a score of zero. You have been given both of these tests at the start of the term, and the homework and journals will give you everything you need for the tests, so there is no excuse for procrastination.

Illness must be assessed by the Student Health Center---this is not an Honor Code issue; in my experience, young college students often neglect their health.

Students will not be permitted to share a calculator when they take their tests. Such practice puts stress on the honor system. Failure to adhere to these rules may result in discretionary grade deductions and/or honor code procedures.

Questions pertaining to tests will be answered, given the conditions delineated in the test instructions. Questions pertaining to the tests will NOT be answered the day they are due nor will they be answered the day before they are due! No procrastination!

**ALL TESTS ARE TO BE PLEDGED UNDER THE HONOR CODE REGULATIONS!**

Washington and Lee University makes reasonable academic accommodations for qualified students with disabilities. All undergraduate accommodations must be approved through the Office of the Dean of the College. Students requesting accommodations for this course should present an official accommodation letter at the start of the course. It is the student's responsibility to present this paperwork in a timely fashion and to follow up about accommodation arrangements. Accommodations for test-taking should be arranged with the professor at least a week before the date of the test or exam. Note, because the tests are out of class and are not timed, there should be no need for time accommodations on the tests.

### HOMEWORK ASSIGNMENTS

There is a separate handout with all of the course's homework assignments (except for the spectra needed for the very last assignment). Students may consult the professor for homework assignment questions covering the first test; students may not consult each other about those questions. Students may consult

each other about homework assignments covering the second test; students may not consult the professor about those questions. Details about this will become clear as the course proceeds.

### ATTENDANCE

Attendance (including missing class or lateness) in lecture will be graded harshly. The Dutch are VERY conscious of punctuality, and lateness is the height of rudeness in their country. Therefore, we will be practicing our punctuality and reliability in this Chem 156 course.

Please demonstrate courtesy for the other members of the class and the professor by avoiding class disruption. This includes **turning off cell phones** and other electronic devices. The use of laptop computers in class is prohibited, unless permitted by qualified disability (see above); when electronic device use is permitted, it may only be used for course purposes---no email, web-surfing, etc. If a student persists with electronic device issues, the professor reserves the right to make any grade deductions necessary to satisfactorily address the problem.

Three times during the term I will schedule some small group work for us (“breakout mini-lab exercises”). I will work around your class schedules to create these meeting times.

### TRAVEL SCHEDULE

April 19, 2014: Current tentative arrival date in The Netherlands at Schiphol Airport for the class

May 16, 2014: Current tentative return to United States. Students remaining in Europe are on their own.

### APPROXIMATE GRADES

If I get the sense that the entire class is doing consistent, high quality daily work, there will be no surprise quizzes, or surprise tests, so use some positive and encouraging peer pressure! ☺ I actually hate surprise quizzes and have never used them in 20.5 years at W&L, but I will use them if I have to.

The student seminars are to be of professional quality and last about 25 minutes. Use of notes by the speaker will result in a 0% score for the seminar. PowerPoint presentations are required. Proper references must be displayed on each slide, when reference material has been used. You are to employ the PowerPoint slide template that I use for my talks. Sloppy, ill-prepared seminars will be viewed with great distaste and graded accordingly. You may consult anyone in the class or outside of the class (that you can get to help you) for assistance with the preparation of the seminar---just acknowledge it. The second seminars will occur in The Netherlands. I have used, with acknowledgment, student slides in my seminars at W&L and at other meetings/workshops/conferences, so it is imperative that you use the PowerPoint slide template I give you, and that you carefully document the slides and make them professional.

I reserve the right to give the class a righteously brutal final exam if I judge that good learning at W&L or in The Netherlands is not transpiring. You should be encouraged to know that this has always been unnecessary in the past---if you tread the righteous paths of your predecessors, all will be well! ☺

### Approximate Grading Scheme

Weekly journal entries/reading reports/homework, etc:	20% (journal quality, homework quality, reading preparation quality)
PowerPoint talk #1	20% (Quality of preparation, slides, and presentation)
Preparation for PowerPoint talk #2	10% (PowerPoint talk #2 is given in The Netherlands, but the research, image scans, etc. that you need must be in your possession before you leave)
Take home tests (2)	40% (see instructions/rules for each test)
Notebook and group work	5% Maintaining organized notes, journals, group work
Travel game plan	5% Planning an independent educational excursion for the trip (may very much be linked to fun too!)
Conduct	0-100% (Punctuality, responsibility, work ethic, etc.)

Notes: (1) Pretty much each week you will turn in an electronic document the day before class that will typically follow the format described here: first, an approximately 1000 word journal about the previous class; second, your homework; third, a reading report of approximately 400 words; fourth, a short report on your research progress for your Powerpoint presentation of approximately 100-200 words. For the first week or two, I will post my favorite journal entries from weeks one and two last time the course was taught. These are not to be copied, but to give you an idea of what you should be doing. The journal entries and reading reports and research progress reports must be written in grammatical and complete sentences, but are NOT formal essays. Careful thought but fast writing is what I want. (2) Your PowerPoint talks need to be superb---talk to me in advance a LOT for help. (3) Group work involves homework collaboration and other types of stuff. (4) The take home tests are not intended to induce great stress, but for me to make sure that you have fundamental skill topics practiced to at least a rudimentary level. I have discovered that, while I really enjoy the journal format, it does not give me the ability to see skill set practice. (5) Your work each week outside of class should be approximately 8-9 hours for someone who has no knowledge beyond high school of math, science, or art history; approximately 7-8 hours for someone who has had Chem 110 or has a deep knowledge of Baroque painting; 6-7 hours for someone who has had Chem 110 and has a deep knowledge of Baroque painting. (6) Travel game plan---you will have time on your own during the four weeks in The Netherlands. Think

about your own personal budget and what you would like to do with that time. Much of it can be cool non-course related things, but one part of it should have SOME kind of link to the course. What do you want to do? And then, what plan have you formulated to execute it? [Travel logistics, language, lodging, etc.] (7) You will not have to worry about the conduct portion of the course if you are responsible, punctual, etc. Let me know if you have questions about expectations!!!!!!!!!!!!!!!!!!!!!!

### MISCELLANEOUS

I **urge** you to come talk to me a lot about this class; in fact, that's the only way it will succeed. While we are at W&L, do **not** call me at home, unless an emergency involving death or extreme illness is involved. I will give you my cell phone number; I will need to have yours. Please do not share my cell phone number with other students; I will not share your cell phone number with others.

You should have obtained many items from our International Education Office providing both information and expectations regarding conduct. You have already read and signed the "Agreement of Responsible Travel" form. W&L does not want you to be a victim of misconduct or a perpetrator of misconduct. The Office of International Education reserves the right to remove you from The Netherlands immediately (if necessary) for violations of their expectations. Read those materials and read W&L's web site on drug and alcohol issues, sexual misconduct, etc. at <http://counsel.wlu.edu/policy/>

Note that if your attendance is not good, or your conduct causes us issues, I reserve the right to have that severely impact your grade without regard to the grading guidelines set above. For example, if conduct issues affect your presence in CHEM 156 or ARTH 356, you might fail either/both courses and never be allowed to repeat. NOTE! Conduct outside of Chem 156 (or Arth 356) can result in your being dismissed from The Netherlands course!!!!!! This is not my rule---it is a University policy. For instance (but not limited to this), if you have alcohol or drug events, the University will not consider it prudent to send you abroad, and you will forfeit your money to the University for the spring term class. I know of instances both in my spring term abroad class and in other faculty members' spring term abroad classes where this has happened. Note that punctuality is HUGE in The Netherlands, so we will practice stringent punctuality in our courses---tardiness can result in grade deductions---possibly severe depending on the amount of tardiness and the situation.

Note that Universiteit Maastricht also has policies which you will be expected to obey during our stay there.

You are required to provide the instructor with a travel plan when you are not with the group.

Finally, note that while we are in The Netherlands or traveling in the U.S, this is a business trip at all times. Your conduct reflects on your peers, your instructor, W&L, and Universiteit Maastricht. Even acceptable conduct from a tourist is not necessarily acceptable conduct in this course. If you have any questions about acceptable manners, clothing, conduct, etc., please do not hesitate to ask. Note that our hosts at Universiteit Maastricht can give us advice and assistance in dealing with various issues that might arise on the trip, and there are both female and male staff who can be consulted.



Drug use of any kind in the U.S. or in The Netherlands will result in severe repercussions in terms of grades and your enrollment at W&L.

#### USEFUL WEBSITES

<http://www.state.gov/> The U.S. State Department has travel information, warnings, etc.

<http://www.ces.unimaas.nl/> Center for European Studies, Universiteit Maastricht (our hosts)

<http://netherlands.usembassy.gov/> The U.S. Embassy website for The Netherlands

<http://www.ns.nl> The Netherlands train website

<http://www.holland.com/us/> The Netherlands official tourist website

**BY THE SECOND CLASS PERIOD, YOU SHOULD HAVE FINALIZED OR NEARLY FINALIZED YOUR TRAVEL PLANS---OR TALKED TO ME ABOUT WHY THAT IS A PROBLEM.**

**Overall Course Goals for Chem 156.** Students who perform well in Chem 156 should have the following knowledge:

Basic chemical mathematical problem solving and dimensional analysis (including significant figures)

Basic understanding of simple optics

Basic molecular structure identification from simple chemical formulas

Basic application of valence bond theory

Basic application of molecular orbital theory and associated vocabulary

Fundamental knowledge of techniques and instruments used to analyze 17<sup>th</sup> century Dutch paintings

Basic knowledge of 17<sup>th</sup> century Dutch painting, history, and culture