

Why Chemistry Matters

Quest 2 Syllabus

Primary General Education Designation: Physical Sciences

Secondary General Education Designation: Diversity

August 31th, 2020-December 9th, 2020

Holidays: 9/7 (week 2); Veteran's Day 11/11 (week 11); Thanksgiving 11/25-28 (week 13); Homecoming 12/24

Reading Days: December 10-11th.

I. Course Information

Quest 2 IDS2935-2PF1 [23045]

Fall 2020

Meeting MWF: 4

Location: [Zoom]

General Education Designation: [Physical Sciences, Diversity]

* A minimum grade of C is required for general education credit

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Instructor

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Teaching Assistant : NA

Course Description

This cross-disciplinary Quest 2 course examines “Why Chemistry Matters” through analysis and discussion of topics (e.g. agriculture, materials, energy, medicine, human health, nature and the environment) represented in two popular public-facing science novels “The Disappearing Spoon” and “Napoleon’s Buttons” – all focused on aspects of chemical innovations used to tackle problems in society in the past. The course extends these examples to social and political problems of today and the future; asking “How can novel approaches/innovations in chemistry help alleviate or answer current and arising challenges in our world today, such as our food supply and pollution, novel medicines to combat resistance and addiction, and our water supply and the built environment?”, and “How has chemical innovation been motivated by and impacted diverse groups of people?” The answers to these questions will also reveal to students how pervasive chemistry is in their daily lives. One can say, “It is everywhere!” The course is designed in a modular format with three-hour periods each week.

The first session of each module will be used to explain the chemical concepts and principals required to have a deep understanding of the processes and products that humans have used in diverse groups of people throughout history related to that module’s topic (medicine, toxins, pollution, weapons, dyes, sugars, radioactivity, soaps etc). The chemical concepts presented span across general/physical/inorganic/organic/nuclear/biochemistry. An overarching theme throughout the semester is the isolation, characterization or creation of atoms/molecules required for life, extending to those that impact our quality of life. Examples include primary metabolites (sugars, proteins, lipids) and secondary metabolites (toxins and medicines), as well as energy and processes needed for a modern society (such as agriculture and water quality, dyes, chemical weapons, bombs and controlled chemical explosions for infrastructure). Hence, demonstrating how chemistry is “everywhere”.

The second lecture in each module emphasizes the social context of chemistry in the particular applications being examined that week, with emphasis placed upon how scientific developments arise from or impact diverse societies or groups of people (e.g. health disparities, dual-use technologies and regulations, indigenous medicine versus modern pharmaceuticals, gender identity, gender and color, contagion panic and ethnicity/social class, cleanliness and race, set and setting related to drug abuse). Guest lecturers from various non-STEM departments have helped to develop course content and some may be available to participate with the lectures and lead/develop in-class activities that emphasize the merging of chemistry and society, with emphasis on how diversity motivated some chemical innovations and how chemical developments inadvertently effect diverse groups of people.

The third hour of each module involves an experiential learning activity; e.g. in class activities, discussions and reflections, lab demonstrations, laboratory experiments in the General Chemistry Labs, tours of facilities on UF campus (e.g. Ethnobiology gardens, AMRIS facility) or workshop activities to help develop student skills for their public-facing writing pitch assignment.

There will be a quiz each week (MC, T/F, short answers) to assess that students have read/watched the assigned materials and to demonstrate SLOs related to content for chemical and social concepts. Each week there will also be a discussion post to meet the critical thinking, communication and connection SLOs for Quest 2, Gen Ed-P and Gen Ed-D. Exams will be delivered in essay and short answer format, and exams will be designed to meet the merging concept SLOs for Quest 2. In class activities (depending on student enrollment can be group or individual) and the corresponding assignments will be designed to assess reflection and data analysis aspects of SLOs.

This course is expected to be of interest to STEM majors who wish to seek a deeper understanding of how “*what we do*” is motivated by and impacts social aspects, including diversity, in our lives. By describing and analyzing how chemical innovations and the scientific method arise from or have impacted various societal groups within the United States and across the globe, sessions 2 and 3 each week; along with their corresponding assignments and assessments, this course will meet the SLOs for Diversity. This course will also appeal to non-STEM majors who seek to have a deeper understanding of where and how chemistry is essential to their daily lives and impacts life’s perceived quality. The SLO requirements for the Physical Sciences will be met by activities of sessions 1 and 3 of each module (along with corresponding assignments), where descriptions of chemical concepts and analysis of experimental methods and results will be performed.

It is not required that you have any college level science course as a prerequisite for this course as the chemistry and scientific concepts within *Disappearing Spoon* and *Napoleon’s Buttons* will be addressed. High-school level understanding of chemistry/physics is expected.

Required & Recommended Course Materials (to purchase/rent)

- *“The Disappearing Spoon and Other Extraordinary True Tales from The Periodic Table”* Sam Kean
- *“Napoleon’s Buttons: How 17 Molecules Changed History”* Penny Le Couteur and Jay Burreson
- *Other reading content will be provided on Canvas*

Statement on Materials and Supplies Fees

There are no extra fees for this class

II. Coursework & Schedule

1. List of Graded Work

Work	Description	Percentage
On-line quizzes	Approximately each week there will be an on-line quiz that covers the content of the reading and lecture materials.	15
On-line discussions	Almost every week there will be an on-line discussion that evaluates critical thinking and reflective components of the integration of the chemical and social concepts of that module. Most of these will be performed as group activities	20
Exams	There will be two exams that assess your knowledge, comprehension, and evaluation of course materials. This semester these will be on-line or take home.	20
In-class activities ad experiential Learning Activities	Each week there will be either an in-class activity or an experiential learning activity (most will be group activities depending upon enrollment) that you will do during one period that will involve analysis, synthesis and evaluation of presented materials. Please check on Canvas for due dates and times. [tours, demos, experiments, data analysis, reflections]	20

Participation	You are expected to come prepared for M/W lecture/seminar presentations and to be fully engaged and participating in the Friday activities. There are some activities that are graded that are participation (like introduction to groups etc.)	5
Public-Facing Pitch	In efforts to engage with the public on Chemistry Issues that impact society, you will compose a pitch to an editor for a public-facing chemistry article of a topic of interest to you that relates to a current or future social challenge where chemistry can impact. Two course periods are set aside for development of your pitch topic and a workshop to help develop your pitch.	20

2. Weekly Course Schedule (subject to change; content provided in CANVAS is up-to-date and correct)

Week/ Date	Topic (Question/Subject)	Physical Sciences + Q2 + Diversity Method/Concept/Practice at Work	Reading & Activities for Before Class, during Tours and Experiments and Discussion Posts	Assigned Work Due Discussion, Quizzes and Activity Due Dates posted in Canvas
Week 1 Aug 31- Sept 04	Fertilizers, Weapons and Food Sustainability		<i>Gail Fanucci, Gabriel Mathias-Landry (Soil and Water Science)</i>	
M	Examining Chemical Fertilizers and their Relationships to Chemical Warfare	Redox Chemistry, Catalysis and Fertilizers	Read: <ul style="list-style-type: none"> Disappearing Spoon, Chapter 5 "Elements in Time of War," pages 81-87. Napoleon's Buttons, Chapter 5 "Nitro Compounds," pages 98-102 Watch: <ul style="list-style-type: none"> Haber Bosch Process Need for New Fertilizers Father of Chemical Warfare 	
W	Phosphorus Cycle and Organic Farming	Growing Populations Nitrogen and Phosphorus cycle	Read: Vitousek, P.M., et al. (2009) Science, 324: 1519-1520. Lecture Slides Provided.	Quiz – assess reading/viewing materials and comprehension.
F	Evaluating Organic Fertilizers and Run-off Nitrogen and Phosphorus Pollution	analysis of run-off pollution (F)	Assignment Provided, please come to class prepared to work on the activity together.	Fertilizer Data Analysis (Group; In class activity and upload final analysis)
Disc.	Unintended consequences of developing fertilizers	Bombs, Chemical Warfare, Chemical industry, Pollution	Discussion Post examples of modern day problems and solutions: <ul style="list-style-type: none"> Recycling Human Sewage to Fertilizers in Cities Utilizing CRISPER/CAS technology to engineer babies Engineering factory emissions for jet fuel 	Fertilizers, Weapons and Food Sustainability Discussion
Week 2 7-11 Sept.	Explosions, Gases and the Built Environment		<i>Gail Fanucci,</i>	
<i>M</i>	Holiday			

W	What are Explosions?	States of Matter, Thermodynamics, Chemical Reactions, Components of a controlled Explosion	<p>Read:</p> <ul style="list-style-type: none"> Disappearing Spoon, Chapter 1 "Geography is Destiny" pages 11-31 Napoleon's Buttons, Chapter 5 "Nitro Compounds," pages 87-104 Sodium Metal disposal following WWII (Links to external site.) Sodium Azide Usage in Airbags (Links to external site.) Explosives History (downloadable file) <p>Watch:</p> <ul style="list-style-type: none"> States of Matter Deflated footballs and Ideal Gas Law 	Quiz – assess reading materials and preparedness.
F	Explosion versus Combustion	Synthesizing and Analyzing unstable compounds and Redox reactions of alkalis with water	<p>Read:</p> <ul style="list-style-type: none"> Nitrogen Triiodide Experiment (Links to an external site.) Alkali Metal Demo Standard Operating Procedure (SOP) <p>Watch:</p> <ul style="list-style-type: none"> Reactions of Alkali Metals with Water Reaction of Cesium with Fluorine gas. 	Lab Demonstration and Experiment (upload experiment analysis and reflection: Explosions Demo and Experiment)
Disc.	Rocket Fuels and Commercial Space Travel	Analyze, reflect and connect with how explosive compounds have contributed to infrastructure development	<p>Read and Comment on your Reaction:</p> <ul style="list-style-type: none"> https://blogs.nasa.gov/Rocketology/2016/04/15/weve-got-rocket-chemistry-part-1/ https://blogs.nasa.gov/Rocketology/tag/chemical-reactions/Space Tourism 	Discussion: Analysis and Reflection on Views of Explosives
Week 3 14-18 Sept.	Lead and Political Regulations		<i>Gail Fanucci, Suzanne Robbins (Political Science)</i>	
M	How old is our Planet? Why was Lead removed from Gasoline?	Radioactivity, Isotopes, How Elements are Formed, Lead and Cadmium Pollution	<p>Read:</p> <ul style="list-style-type: none"> Disappearing Spoon, Chapter 4 "Where Elements Come From," pages 65-80 Disappearing Spoon, Chapter 9 "Poisoners Corridor" <p>Watch:</p> <ul style="list-style-type: none"> The Clean Room; Nucleosynthesis: The Formation of Elements in the Universe 	Quiz – assess reading materials and preparedness.
W/F	Political Lobbying and re-framing social issues to appeal to emotion	Framing Political Issues, External and Internal Lobbying (W) Analysis of Chemical Company and Interest Group Lobbying Activities (F)	<p>Read:</p> <ul style="list-style-type: none"> Madison, James (1787) Federalist Papers #10: "The Same Subject Continued: The Union as a Safeguard Against Domestic Faction and Insurrection" from <i>The New York Packet</i>. Five pages long <p>Examine:</p> <ul style="list-style-type: none"> https://www.senate.gov/legislative/Public_Disclosure/LDA_reports.htm. https://archive.epa.gov/ocir/leglibrary/pdf/112senatejuris.pdf https://www.opensecrets.org/cong-cmtes 	Lobbying Analysis (Group; In class activity and upload final analysis)

Disc.	Lead regulations from diverse groups	Evaluate Various positions and regulations related to Lead pollution	<ul style="list-style-type: none"> Identify, describe, compare and analyze various groups seeking regulations on lead on Regulations.Gov 	Lead and Political Regulations Discussion Post
Week 4 21-25 Sept.	Radioactivity and the Ethics of Nuclear Power		<i>Gail Fanucci, Duncan Purves (Philosophy), Katye Poole(EH&S)</i>	
M	Elements of WWII and the Cold War	Nuclear chemistry, fission and fusion, making elements, bombs to isotopes in medicine	<p>Read:</p> <ul style="list-style-type: none"> Disappearing Spoon, Chapter 6 "Completing the Table with a Bang," pages 98-114 Disappearing Spoon, Chapter 7 "Extending the Table, Expanding the Cold War" pages 115-134 Disappearing Spoon, Chapter 12 "Political Elements" pages 203-221 How we Make Elements (external link) <p>Watch:</p> <ul style="list-style-type: none"> Isotopes in Medical Science 1 Making Medical Isotopes 	Quiz –assess reading materials and preparedness.
W	Philosophy of Dual Use technology	Dual-use technology, Bombs to isotopes in medicine,	<p>Read:</p> <ul style="list-style-type: none"> Douglas, Thomas (2014) "The dual-use problem, scientific isolationism and the division of moral labour" Monash Bioethics Review 32: 86-105. Shane, Scott & Daisuke Wakabayashi (2018) "'The Business of War': Google Employees Protest Work for the Pentagon" The New York Times (April 4): A1 	none
F	How to be Safe with Chemistry	Safety Culture and Risk Assessment science/political regulation agencies	<p>Read:</p> <ul style="list-style-type: none"> Safety Culture (Links to an external site.) Hazard Assessment Fundamentals, Assessments and Tools (Links to an external site.) Lecture Slides Laboratory Safety and Risk 	Work on Pitch Activities Step 1 of Pitch Assignment : Interview Questions (due this week)
Disc.	Current Ethical debates with new technologies	Identifying, describing and reflecting on personal views of gene editing ethics	<p>Read and React to:</p> <ul style="list-style-type: none"> https://www.huffingtonpost.com/entry/gene-edited-babies-crispr-cas9_us_5c0078fde4b0249dce734190 (Links to an external site.) https://www.nature.com/articles/d41586-018-07573-w 	Discussion Post
Week 5 9/28-10/02	Early Medicine and Indigenous Discovery		<i>Gail Fanucci, Rick Stepp (Anthropology)</i>	
M	Spices and Trade, Essential Oil Show and Tell	organic chemistry structures, trade routes and colonialization, ascorbic acid and	<p>Read:</p> <ul style="list-style-type: none"> Napoleon's Buttons, Introduction pages 1-19. Napoleon's Buttons, Chapter 1 "Peppers, Nutmeg and Cloves," pages 19-35 Napoleon's Buttons, Chapter 2 "Ascorbic Acid," pages 36-53 	Quiz –assess reading materials and preparedness.

		scurvy, Age of Discovery, chemical components of spices, medicinal properties of spices	<ul style="list-style-type: none"> Scurvy and Ascorbic Acid (Links to an external site.) Nutmeg 	In Class Geography/ Map Exercise
W	Indigenous Discovery and Ethnobiology	Farming and harvesting practice effects on secondary metabolites in tea	<p>Read:</p> <ul style="list-style-type: none"> Etkin, Nina L., and Elaine Elisabetsky (2005) "Seeking a transdisciplinary and culturally germane science: The future of ethnopharmacology," <i>Journal of Ethnopharmacology</i> 100: 23-26. Ahmed, Selena, Uchenna Unachukwu, John Richard Stepp, Charles M. Peters, Chunlin Long, and Edward Kennelly (2010) "Pu-erh tea tasting in Yunnan, China: Correlation of drinkers' perceptions to phytochemistry," <i>Journal of Ethnopharmacology</i> 132: 176-185. 	
F	Use Time for Ethnoecology/Garden Tour	Identify and discuss plants and their herbal/medical/toxic uses	<p>Resources:</p> <ul style="list-style-type: none"> UF Herbarium Collections catalog: https://www.floridamuseum.ufl.edu/herbarium/cat/ Floristic Inventory of the University of Florida Campus: https://www.floridamuseum.ufl.edu/herbarium/research/ufcampusflora.htm 	Video upload of a specific plant on your tour.
Disc.	Evaluation of Biases for Natural/ Traditional medicines	Evaluate Literature and Reflect on Views of Natural Medicine versus Pharmaceuticals	<p>Read:</p> <p>Internationalization of Traditional Chinese Medicine: challenges</p> <p>Utilize PubMed and Library Databases</p> <p>Synthesize your views and reactions to current scientific research into effectiveness of essential oils and herbal medicines and how you viewed prior and after the module uses of herbal remedies and essential oils (common in Asian cultures)</p>	Discussion Post
Week 6 5-9 Oct.	Sugars and Social Inequalities		<i>Gail Fanucci, Alyssa Zucker (Women's Studies)</i>	
M	Sugars as Food, Clothing and Medicine	Sugars and carbohydrates, colonialization of Americas, cellular glycans and cancer, slavery and carbohydrates, synthetic versus artificial	<p>Read:</p> <ul style="list-style-type: none"> Napoleon's Buttons, Chapter 3 "Glucose," pages 54-70 Napoleon's Buttons, Chapter 4 "Cellulose," pages 71-86 Napoleon's Buttons, Chapter 6 "Silk and Nylon," pages 105-122 Inulin (Links to an external site.) Colonialization and Trade (II): "colonization of the Americas" (Links to an external site.) "Making of an Atlantic World" (Links to an external site.) 	Quiz –assess reading materials and preparedness.

W	Social Inequalities of our Food	Identify the causality between socioeconomic conditions and public health	Read: <ul style="list-style-type: none"> Schulze, Matthias B., et al. (2004) "Sugar-Sweetened Beverages, Weight Gain, and Incidence of Type 2 Diabetes in Young and Middle-Aged Women. Journal of the American Medical Association. 292(8): 927-934. Schulze, Amy J., et al. (2005) "Healthy Eating and Exercising to Reduce Diabetes: Exploring the Potential of Social Determinants of Health Frameworks Within the Context of Community-Based Participatory Diabetes Prevention. American Journal of Public Health. 95(4): 645-651. 	
F	What do we choose to eat?		Analyze the relationship between food availability and nutrition. Explore: Fooducate (Links to an external site.) Website If we choose to bring in samples of our favorite snacks, "Students concerned about the cost of participation should contact the instructor as soon as possible to learn about possible financial assistance."	On-line submission: Evaluation and Analysis Activity of Weekly Food choices
Disc.	Diabetes and Diversity (Location, Class and Race)	Content, Analysis and Reflection on Solutions to Food availability and Diabetes	<ul style="list-style-type: none"> Impact of Urban Gardens (Links to an external site.) Ethnic Minorities and Managing Diabetes (links to external site) 	Discussion Post
	Pitch Topic Selection	Connection and Communication	Start to think about your Topic for your Pitch and locate three sources by Week 10 Workshop. Preliminary Topic Selection due this week	
Week 7 12-16 Oct.	Dyes, Energy and Social Uses of Color		<i>Gail Fanucci, Melissa Hyde (Art History), Daniel Talham (Chemistry)</i>	
M	Dyes, Pigments and the Chemical Industry	Absorption, spectroscopy, synthetic dyes, dyes and the FDA, photosynthesis and solar cells	Read: <ul style="list-style-type: none"> Napoleon's Buttons, Chapter 9 "Dyes," pages 162-180 How Dye's impacted the foundation of the FDA (Links to an external site.) History of the Chemical Industry (links to an external site) 	
W	Cultural Attitudes and the Meaning of Color	Color and gender Historical Meaning and Social Impact of Colors	Read: <ul style="list-style-type: none"> Jo Paoletti, Pink and Blue, Telling the Boys for the Girls in America (2012) Ch. 5, "Pink is for Boys," pp. 85-99 Regina L Blaszyk, The Color Revolution, (2012), pp. 21-32 (section on mauve) https://www.theawl.com/2017/11/prussian-blue-the-color-of-great-waves-and-starry-nights/ (Links to an external site.) http://www.artinsociety.com/prussian-blue-and-its-partner-in-crime.html (Links to an external site.) 	Quiz – assess reading materials and preparedness

			Optional: <ul style="list-style-type: none"> • https://play.google.com/books/reader?id=IAJiBQAAQBAJ&hl=en&pg=GBS.PT99 (Links to an external site.) • https://www.chemistryworld.com/podcasts/prussian-blue/6101.article (Links to an external site.) 	
F	Let's Play with Prussian Blue!	Experiential Learning through experimentations	<ul style="list-style-type: none"> • Check out this ACS link (Links to an external site.) for a description of the chemical structure of Prussian Blue. • Lab Demo information: Dye Diffusion Demonstration Report-2.pdf • PrussianBlue Demo Notes 2_19 (1).pdf 	Dye Experiments and Analysis Report
Disc.	Nature and Chemistry of Color	Evaluate how nature has inspired colors; reflect on personal views of color	Describe the Chemistry of making three colors in the assigned video and research and present a social interpretation of that color past and present. Reflect on how you feel when you wear clothing of the chosen colors.	Discussion Post
Week 8 19-23 Oct.	Interview with Free-lance Public Facing Writer and Exam			
M	review		Review of Interconnected Chemical and Social Concepts	
W	exam		In-Class Exam 1	
F	Free-lance writing?	<p>Skype/Zoom interview with Rebecca Altman visit: http://rebecca-altman.com/home</p> <p>Q2 connection and communication</p>	<p>Browse:</p> <ul style="list-style-type: none"> • "Object Lessons", short stories from The Atlantic that talk about important (and often chemistry-created) objects in our lives: http://objectsofobjects.com (Links to an external site.) • OpenNotebook.com to explore how the best science stories are put together: https://www.theopennotebook.com/ <p>Read two of the following articles by Dr. Altman before class:</p> <ul style="list-style-type: none"> • This article on the impact of chemical synthesis across many aspects of society has an unexpected UF connection! Check it out: https://aeon.co/essays/how-20th-century-synthetics-altered-the-very-fabric-of-us-all (Links to an external site.) • This article is about the discovery of the benzene ring, learning to build on the benzene ring, its industrialization, including of PCBs and related organochlorines. But also about war and empire and chemistry: https://www.theatlantic.com/science/archive/2017/10/benzene-tree-organic-compounds/530655/ (Links to an external site.) <p>Here are her source documents for this: https://static1.squarespace.com/static/5703f76762cd94e407457a23/t/59e4df3790bade2acfeb691/1508171576588/Altman+Benzene+Tree+Selected+Bibliography+October+2017v2.pdf (Links to an external site.)</p>	Step 2 of Pitch Assignment: Select a Topic and Locate 3 Sources (due Week 8)

			<ul style="list-style-type: none"> This article is about polyethylene and the plastic bag: https://www.topic.com/american-beauties (Links to an external site.) here are her sources: https://static1.squarespace.com/static/5703f76762cd94e407457a23/t/5b64b6ba70a6adc72332a0ea/1533327034796/Altman_Am_Beauties_Topic_Aug2018_Resources.pdf (Links to an external site.) This article is about the rise of plastics in general, but uses personal narrative in a strategic way: https://aeon.co/essays/plastics-run-in-my-family-but-their-inheritance-is-in-us-all 	
Week 9 26-30 Oct.	Germs and Public Health		<i>Gail Fanucci, Pamela Gilbert (English)</i>	
M	Germ Theory and Antibiotic Resistance	Antiseptics, antibiotics, secondary metabolites, bacteria, theories of disease, history of surgery	<p>Read:</p> <ul style="list-style-type: none"> Napoleon's Buttons, Chapter 7 "Phenol," pages 123-140 Napoleon's Buttons, Chapter 10 "Wonder Drugs" pages 181-20 Disappearing Spoon, Chapter 10 , "Take Two Elements and Call Me in the Morning" Drug Resistance to Antibiotics (Links to an external site.) (Links to an external site.) Bacteria in skin care products? (Links to an external site.) CENEws cover story on Cosmetics: The next Microbiome (Links to an external site.) Microbiome and Short Chain Fatty Acids <p>Watch:</p> <ul style="list-style-type: none"> Antibiotic Resistance (Links to an external site.) Gut Microbiome (Links to an external site.) Claire Fraser: The Human Gut Microbiome in Health and Disease (Links to an external site.) 	Quiz – assess reading materials and preparedness.
W	Cholera and Contagion Panic	Contagion panic, disease, social group and social status, existing beliefs and cognitive frameworks, AIDS in the 1980s	<p>Read:</p> <ul style="list-style-type: none"> a summary article from Dr. Gilbert: Gilbert, Pamela K. (2012) "On Cholera in Nineteenth-Century England." BRANCH: Britain, Representation and Nineteenth-Century History. Ed. Dino Franco Felluga. Extension of Romanticism and Victorianism on the Net. Web. http://www.branchcollective.org/?ps_articles=pamela-k-gilbert-on-cholera-in-nineteenth-century-england (Links to an external site.) this 1800s essay by physician and public health campaigner Thomas Southwood Smith (Links to an external site.) to see how people made sense of germ theory at the time, which may put into perspective how we make conclusions about chemistry today: Excerpt from Thomas Southwood Smith, 	Step 3 of Pitch Assignment: Evaluate a Pitch (due Week 9)

			<p>"Contagion and Sanitary Laws," The Westminster Review (Jan. 1825), pp: 134-167.</p> <p>AIDS as a contagion (Links to an external site.)</p> <p>HIV and AIDS likely represents a modern day twist of Cholera and the interplay between medical understanding, treatments, politics and social class.</p> <ul style="list-style-type: none"> • 30 years of AIDS (Links to an external site.) • HIV in the 1980s: People didn't want to kiss you on the cheek (Links to an external site.) 	
F	What's in that?	Group Activity	Evaluate and Analyze Chemical Components in Common House Hold Cleaners	Upload Analysis Information
Disc.	Good Bacteria?	Dual-Usage Theme and Reflection	<p>Read:</p> <ul style="list-style-type: none"> • Virgin airlines has jet fuel that was made from CO₂ recovery from industrial pollution via engineered bacteria.: https://www.cnbc.com/2018/07/27/lanzatech-turns-carbon-waste-into-ethanol-to-one-day-power-planes-cars.html (Links to an external site.) • Using bacteria to combat global warming. <p>Describe, reflect and evaluate your views on good/bad bacteria as well as those of someone two generations ahead of you (ie your grandparent's generation)</p>	Discussion Assignment
Week 10 02-06 Nov.	Natural Products and Drug Discovery		<i>Gail Fanucci, Jeffrey Rudolf (Chemistry)</i>	
W	History of Pain Medicine	Organic chemistry functional groups, chemical synthesis schemes, introduction to medicinal chemistry, molecules of witchcraft	<p>Read:</p> <ul style="list-style-type: none"> • Napoleon's Buttons, Chapter 12 "Molecules of Witchcraft," pages 223-245 • Napoleon's Buttons, Chapter 10 "Wonder Drugs" pages 181-200 • Disappearing Spoon, Chapter 11 "How Elements Deceive" • Disappearing Spoon, Chapter 9 "Poisoners Corridor" (already assigned in week 2: this ties back to Lead poisoning and radioactivity we saw earlier) <p>Watch Videos:</p> <ul style="list-style-type: none"> • Introduction to Medicinal Chemistry (Links to an external site.) Minimize Video • Molecules of Witchcraft - Dr. Christina Miller - October 31, 2012 (Links to an external site.) 	Quiz –assess reading materials and preparedness.

F	Natural Products Research Seminar	Jeff Rudolf presents modern day research activities in: Genome Mining and Combinatorial Chemistry for Drug Discovery	Read: "Natural Products Drug Discovery Wins a Nobel Prize" https://blogs.sciencemag.org/pipeline/archives/2015/10/05/natural-products-drug-discovery-wins-a-nobel?r3f_986 (Links to an external site.) "A New Golden Age of Natural Products Drug Discovery" "Drug-resistant superbugs may have found a new foe in the Irish soil"	
M	Writing Workshop	Components of a Pitch	Completed Pitch Topic Session Assignment prior to this class period. Visit: visit: https://seantrainor.org/	Develop Components of your Pitch – in class; submit after workshop.
Disc.	Pitch Topic Selection	Connection and Communication	Select a Topic and locate three sources by Week 10 Workshop	Step 3 of Pitch Assignment
Weeks 11/12 Nov 9 & 13; 16	Drugs, Poisons and Addiction		<i>Gail Fanucci, Trysh Travis (Women's Studies)</i>	
M	Pick your poison	Caffeine, Nicotine, Morphine, Opioid Epidemic and current solutions	Read: <ul style="list-style-type: none"> Napoleon's Buttons, Chapter 13 "Morphine, Nicotine and Caffeine," pages 246-269 Disappearing Spoon, Chapter 9 "Poisoners Corridor" (this ties back to Lead poisoning and radioactivity we saw earlier) Caffeine Addiction (Links to an external site.) Vaping (Links to an external site.) Jane Aldrich (Links to an external site.): UF Faculty fighting opioid addiction Watch: <ul style="list-style-type: none"> Opioids: Fighting Addiction with Chemistry (Links to an external site.) (https://www.acs.org/content/acs/en/acs-webinars/program-in-a-box/pib-on-demand/opiates/recording.html (Links to an external site.)) Fighting Nicotine Addiction (Links to an external site.) Chinese Opium Wars 	Quiz – assess reading materials and preparedness.
Disc.	How do we view addiction?	Reflection of views	Complete worksheet. Some questions are prior to reading, some are after reading assignments: Due Prior to Wed Class	Due Prior to Wed Class Period
F	What is a Drug Addict?	Set and Setting;	Read: <ul style="list-style-type: none"> Waldorf, Dan. (1998) "Becoming a Heroin Addict" in The American Drug Scene: An Anthology (2nd Ed), Roxbury Publishing Company, pp. 94-104. 	

			<ul style="list-style-type: none"> Zinberg, Norman E. (1984) "The New Perspective on Control" in Drug, Set, and Setting. New Haven: Yale University Press: pp. 4-18. Reading Worksheet:TT-Chemistry Molecules Prep Sheet.pdf 	
M	Drugs vs Medicine Discussion	Scheduled Drugs and Barriers to Research besides Drug Abuse	<p>Read:</p> <ul style="list-style-type: none"> An ethical exploration of barriers to research on controlled drugs (Links to an external site.) Illegal Drugs Laws: Clearing a 50-Year-Old Obstacle to Research 	Questionnaire due at end of class period
Week 12&13 18-23 Nov.	Salt and Sustainable Environments		<i>Gail Fanucci, Mike Volk (Landscape Architecture), Chris Brewer (Chemistry)</i>	
W (11/18)	What is a salt?	Solid-state chemistry Redox chemistry Public Health: Iodine in salt; Fluoride in water	<p>Read:</p> <ul style="list-style-type: none"> Napoleon's Buttons, Napoleon's Buttons15-Salt.pdf Solid State Lattice Structures (Links to an external site.) Iodine and Public Health (Links to an external site.) World Health Organization on Iodized Salt (Links to an external site.) Water Fluoridation and Public Health <p>Watch:</p> <ul style="list-style-type: none"> Oxidation and Reduction: (Links to an external site.) https://www.khanacademy.org/science/chemistry/oxidation-reduction/redox-oxidation-reduction/v/introduction-to-oxidation-and-reduction?modal=1 (Links to an external site.) Introduction to electrolysis (Links to an external site.) Solid State structures 	Quiz – assess reading materials and preparedness.
M (11/23)	Sustainable Urban Planning		<p>Read:</p> <ul style="list-style-type: none"> Partial Overview: A quick summary of the relationship between salinity and water resources: http://www.tampabay.wateratlas.usf.edu/shared/learnmore.asp?toolsection=lm_salinity (Links to an external site.) Issues: Saltwater intrusion in SE Florida: https://www.miamiherald.com/opinion/editorials/article212844644.html (Links to an external site.) Opportunities: The Tampa Bay desalination plant: https://www.tampabaywater.org/tampa-bay-seawater-desalination-plant <p>Watch:</p> <ul style="list-style-type: none"> Water Desalination Video (Links to an external site.) 	

			<ul style="list-style-type: none"> How salt water desalination works (Links to an external site.) 	
F (11/20)	Corrosion Experiment		<p>Read over the Corrosion Lab Protocol</p> <p>Perform and Analyze corrosion experiments and effects of salt water and protection anodes.</p>	Report Analysis Due 24 hrs after experiment
Disc (11/24)	Water Shortages	Solutions and Social Impacts	<p>Read or watch the following:</p> <p>Water Shortages:</p> <ul style="list-style-type: none"> https://qz.com/1180035/uae-has-built-the-worlds-largest-water-reserve-in-liwa-desert/ (Links to an external site.) Cape Town's Water Crisis Approaches Day Zero (Links to an external site.) How drought and the fight for water is splitting the state of California (Links to an external site.) The Atlanta Basin and Florida's Rivers <p>Participate in the discussion post to evaluate the who has and who has not water? What groups are negatively impacted?</p>	Discussion Post due by Friday class session <i>Florida/Georgia water debate</i>
Week 13&14 18-23 Nov	Steroids, the Brain and Gender Identity		<i>Gail Fanucci, Julia Graber (Psychology),</i>	
W (11/18)	Hormones from urine?	Steroids as metabolites, social impact of the Pill, chemistry of family planning, gender and gender identity, climate change and gender	<p>Read:</p> <ul style="list-style-type: none"> Napoleon's Buttons, Chapter 11, "The Pill" https://www.fpa.org.uk/factsheets/contraception-past-present-future (Links to an external site.) https://www.businessinsider.com/male-birth-control-startup-backed-y-combinator-your-choice-therapeutics-2019-4 (Links to an external site.) https://www.livescience.com/65078-male-birth-control-pill-tested-safety.html (Links to an external site.) https://www.scientificamerican.com/article/is-climate-change-producing-too-many-female-sea-turtles/ (Links to an external site.) https://www.sciencenewsforstudents.org/article/when-frog-gender-flips 	Quiz—due prior to first class; assess reading materials and preparedness.
F (11/20)	Puberty, hormones and behavior	Hormonal changes during puberty, Medicines and Social impact of controlling puberty Risk behaviors and puberty	<p>Read:</p> <p>Hyde, J. S., Bigler, R. S., Joel, D., Tate, C. C., & van Anders, S. M. (2018, July 19). The Future of Sex and Gender in Psychology: Five Challenges to the Gender Binary. <i>American Psychologist</i>. http://dx.doi.org/10.1037/amp0000307</p>	none

M (11/23)	How can we see inside of us?	AMRIS tour (magnetic resonance imaging MRI)	Please look over the assignment questionnaire prior to the tour so you know what questions to ask and information to gather	Tour Questionnaire Due 24 hours after tour
Disc	Steroids, the Brain and Gender Identity	Our views and biases on Gender, and Gender Identity and Family Planning	Read: <ul style="list-style-type: none"> • https://www.psychologytoday.com/us/blog/hormones-and-the-brain/201608/gender-identity-is-in-the-brain-what-does-it-tell-us (Links to an external site.) • http://sitn.hms.harvard.edu/flash/2016/gender-lines-science-transgender-identity/ (Links to an external site.) • Future of Sex and Gender in Psychology Hyde et al 2018 (1).pdf • what has sex got to do with it - 2019.pdf 	Discussion Post due by 11/23 session
Week 14 11/30-12/4 Dec	Olive Oils, Soaps and Cleanliness		<i>Gail Fanucci, Pamela Gilbert (English),</i>	
M (11/30)	Soaps and Coatings	Lipids and cholesterol, soaps, coatings, BPA, healthy dietary lipids	Read: <ul style="list-style-type: none"> • Napoleon's Buttons, Chapter 14 "Olive Oil" • Olive Oil: https://www.oliveoiltimes.com/olive-oil (Links to an external site.) (Links to an external site.) • The BPA controversy: https://www.factsaboutbpa.org/bpa-overview/products-bpa (Links to an external site.) • BPA-Free? (Links to an external site.) • Engineering BPA-free polymers: https://www.greenbiz.com/article/valspar-how-we-engaged-stakeholders-solve-bpa-dilemma (Links to an external site.) Watch Videos: Khan Academy: lipids and cholesterol	Quiz –assess reading materials and preparedness. In-class tasting of olive oil samples
W (12/2)	Cleanliness, Advertising and Racism	Imperialism and Cleanliness, Racisms and Cleanliness	Read: <ul style="list-style-type: none"> • McClintock, Anne. (1995) "Soft-Soaping Empire" in <i>Imperial Leather: Race, Gender and Sexuality in the Colonial Context</i>. New York: Routledge: pp 210-231. • https://www.washingtonpost.com/news/business/wp/2017/10/08/dove-ad-that-shows-a-black-woman-turning-herself-white-sparks-consumer-backlash/?utm_term=.baed528af00d (Links to an external site.) Watch: <ul style="list-style-type: none"> • Racism in a Chinese laundry detergent advertisement (Links to an external site.) • Funny Italian laundry commercial - "Coloured Is Better" (Links to an external site.) 	

F (12/4)	Surface Coatings	Super Hydrophobic Experiment	Explore surface coatings, measure contact angles and explore superhydrophobicity	Questionnaire Due end of Experiment Period
Disc.	BPA Awareness	Evaluation and Reflection	<p>Read:</p> <ul style="list-style-type: none"> • The BPA controversy: https://www.factsaboutbpa.org/bpa-overview/products-bpa (Links to an external site.) • BPA-Free? (Links to an external site.) • Engineering BPA-free polymers: https://www.greenbiz.com/article/valspar-how-we-engaged-stakeholders-solve-bpa-dilemma 	Discussion Post
Week 15 7-9 Dec.	Exam2 and Pitch Project Due			Pitch Project Due 12/9 Exam 12/7 inclass

III. Grading

3. Details for grading expectations

a. Attendance and Participation:

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Attendance: will be noted and recorded in the Canvas gradebook. You are allowed two “unexcused absences” for the semester, after which each absences that does not meet university criteria for “excused” will result in a two percent deduction from your final grade. However, unexcused absences on Friday activities will automatically result in a score of zero for participation/assignment if we are doing an activity.

Participation (5% total grade): Consistent informed, thoughtful, and considerate class participation is expected and will be evaluated using the rubric below. The instructor will post your participation grade to date in Canvas when Exam 1 results, and schedule a conference if you are earning below 70% of the possible points. There are also graded activities and discussion posts that contribute to your participation grade.

NOTE: If you have personal issues that prohibit you from joining freely in class discussion, e.g., shyness, language barriers, etc., see the instructor as soon as possible to discuss alternative modes of participation.

General Participation Grading Rubric:

	High Quality	Average	Needs Improvement	Unacceptable
Informed: Shows evidence of having done the assigned reading and in-class work.	100 pts	80 pts	50 pts	0 pts
Thoughtful: Shows evidence of having understood and considered issues raised.	100 pts	80 pts	50 pts	0 pts
Considerate: Takes the perspective others into account.	100 pts	80 pts	50 pts	0 pts

Instructor/TA will note your participation each week giving general scores of high quality, average, needs improvement or unacceptable. The percentages will be recorded in Canvas as two separate assignments and will be averaged to total 5% of your final grade.

b. Discussion Posts (20% total grade):

Approximately each week there will be an on-line discussion in Canvas that evaluates critical thinking and reflective components related to the integration of the chemical and social concepts of that module. Students will be either given (1) additional information to read and asked questions related to self-reflection or (2) asked to identify, describe, discuss and provide references to a current political or societal situation that is analogous to the lessons of that week. Discussion posts will be graded based upon how well students provide responses that are informed, thoughtful, reflective and complete. Discussion post length will typically involve 4-5 paragraphs of response.

General Discussion Grading Rubric:

	High Quality	Average	Needs Improvement	Unacceptable
Informed: Shows evidence of having done the assigned reading and in-class work.	100 %	75 %	50 %	0 %
Thoughtful: Shows evidence of having understood and considered issues raised.	100 %	75 %	50 %	0 %
Reflective: Provides a component of self-reflection that is sincere.	100 %	75 %	50 %	0 %
Complete: Responses are complete and/or consistent with the instructions. Responses also utilize appropriate grammar	100 %	75 %	50 %	0 %

c. Weekly In-Class Activities (20% total grade):

Almost every week there will be an in-class activity or tour that will have a graded assessment that may contain the following: (A) questions with short answers to assess the content of the demonstration/tour etc, (B) short responses asking students to reflect on how integration of concepts in the module impacts or alters their views on that week's topic (graded with a scale similar to reflective component of discussion posts), or (C) possible problems to be solved or data to be analyzed. Grading of problem sets/data analysis/short answers will evaluate completeness and correctness according to the percentages of 100%=high quality, 75% = average quality, 50% = needs improvement, 0% =unacceptable.

d. Public Facing Pitch and related assignments (20% total grade):

There are four graded assessments related to the pitch development and submission.

- A) The first of these is an on-line assignment that will introduce you to select public-facing essays from Rebecca Altman such as “Object Lessons” in *The Atlantic* and essays from *Aeon Magazine*. An important aspect of writing a pitch is having appropriate references and you will be given the source documents for the essays. This assignment will also expose you to the resource “OpenNotebook.com”, showing you various components to develop a pitch to an editor. After digesting the reading material, students will post in the Pitch Discussion Post three questions they would like to ask Rebecca (or another public facing science writer). This assignment will be due prior to the in-class interview with either Rebecca Altman or Dr. Sean Trainer. Grading will be done in accordance with the rubric for Discussion Posts described above. During the In-class interview, students will be evaluated based upon their participation.
- B) The second component to the pitch assignment will be students reporting in The Pitch Ideas and References on-line Discussion Post their identified topic for the pitch and 5 sources. This documentation will be reviewed and feedback will be given. Grading will be done to in accordance with the rubric for Discussion Posts described above.
- C) The third component is the development of the pitch. Prior to the due date, we will have another in-class workshop (a Friday activity) where students will be asked to participate and share the development of their pitch and to provide peer evaluations/discussion regarding how well it is meeting the guidelines provided by Dr. Sean Trainor. This assignment will be graded according to the Participation rubric provided above as well as students turning in written answers to the 7 concepts given in the guide to writing a pitch after obtaining peer review feedback. Students are expected to have active participation and give feedback to other students/groups. This activity may vary depending upon class size as groups of 5 students should be set to help facilitate the effective communication and feedback among the group. The written document will be reviewed by Faculty/TA and feedback will be given. The written document will be graded according to rubrics for correctness and completeness given above.
- D) The final and last component is the grading of the pitch. Pitches will be submitted on-line. Students will be asked to peer review TWO other pitches addressing how well the pitch matched the guidelines given by Dr. Trainer. The final grade will be the average of the faculty/TA grading and TWO peer reviews. Each of the pitches will be evaluated based upon the 7 concepts outlined in the guide to writing a pitch along with evaluating grammar and organization. Scores for these 9 criteria will range from of 100%, 85%, 70%, 50%, 0%; reflective of excellent, very good, average, below average and unacceptable; respectively.

4. Grading Scale

For information on how UF assigns grade points, visit: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

A	≥94 – 100% of possible points		C	≥75 – 80%
A-	≥90 – 94%		C-	≥70 – 75%
B+	≥86 – 90%		D+	≥65 – 70%
B	≥83 – 86%		D	≥60 – 65%
B-	≥80 – 83%		F	<60

I will round to the appropriate unit percentage.

IV. Quest Learning Experiences

5. Course Delivery and Engagement

This course has traditional lecture periods on Monday to examine the chemistry concepts of the modules. On-line quizzes need to be completed each week that evaluate materials presented on-line and within the Monday/Wednesday lectures. Wednesday periods have been developed in conjunction with UF Faculty across campus who are experts in the social/humanities topics that connect a social lesson with our chemistry concepts and solutions to technical/social problems. There are readings/videos for each Monday and Wednesday lecture and sometimes worksheets to be completed beforehand. After the completion of Wednesday's lectures, we will engage with a new problem that intersects the chemistry and social lesson of the module through Discussion posts, which also may have a short reading/video component. Friday's sessions are group activities, facilities tours, demonstrations or lab experiments to enhance our experience of the content being discussed each week. Many of these activities have post-experience surveys, questionnaires or data analysis assignments.

6. Details of Experiential Learning Component

Friday period locations for tours, demonstrations and experiments will be posted in Canvas or announced in class. Chemical experiments will take place in the JHH General Chemistry laboratory; specific lab bench location to be posted in Canvas. Some of these activities have changed this Fall 2020 semester due to the on-line nature of the course.

Campus visits include tours of

- Field and Fork, campus food pantry (<https://fieldandfork.ufl.edu/>)
- UF's Ethnoecology Garden (if incimate weather: UF Herbarium Collections catalog: <https://www.floridamuseum.ufl.edu/herbarium/cat/> and Floristic Inventory of the University of Florida Campus: <https://www.floridamuseum.ufl.edu/herbarium/research/ufcampusflora.htm>)
- UF's AMRIS facility (<https://amris.mbi.ufl.edu/>)

Chemical Demonstrations and Experiments Include:

- Explosive Molecules and Reactions
- Making and Evaluating Dyes
- Corrosion and Corrosion Protection
- Superhydrophobic Coatings

7. Details of Self-Reflection Component

Throughout the semester, the on-line Discussion Posts and Post-lab/tour assignments will contain a reflective component where you evaluate your views on a topic pre- and post- module interactions. For example, you may be asked to describe and evaluate your biases/views on essential oils as medicines prior to an after grappling with the week's module content and activities.

8. What is the essential/pressing question your course explores?

This course shows how Chemistry and Society are intertwined; how societal needs motivate chemical innovation and how chemical innovation impacts our lives in a multitude of ways, making Chemistry and chemical innovation present “everywhere”. This course also explores why “Chemistry” as a field sometimes has a negative public relations view through the dual-use aspect of many chemical innovations that can be utilized for benefit – or harm; intended or unintended. This course aims to broaden the social consciousness of STEM majors to get a deeper understanding of where Chemistry is involved in our daily lives, as well as how chemical innovation is motivated by and impacts social disparities. This course will also provide a basic General Education of chemical concepts and principles within our everyday lives; thus educating non-STEM majors on how it is impossible to separate chemistry from our social world- past present and future.

V. Required Policies

9. Students Requiring Accommodation

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://disability.ufl.edu/>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

10. UF Evaluations Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

11. University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors

that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

12. Counseling and Wellness Center

Contact information for the Counseling and Wellness Center:

<http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

13. The Writing Studio

The writing studio is committed to helping University of Florida students meet their academic and professional goals by becoming better writers. Visit the writing studio online at <http://writing.ufl.edu/writing-studio/> or in 2215 Turlington Hall for one-on-one consultations and workshops.