

# ISC 1010C SECRETS OF ALCHEMY

QUEST 1 THEME: NATURE AND CULTURE

(SECTIONS QAL1 AND QLA2, CLASS #28917 AND #28918)

FALL SEMESTER 2024: AUGUST 22, 2024 – DECEMBER 13, 2024

## I. GENERAL INFORMATION

### CLASS MEETING DAY/TIME/LOCATION:

**Lecture/Discussion Periods:** T7 & R7 in SFH221

**Labs:** T11-E1 (#28917) or W11-E1 (#28918) every other week in SFH110.

**Holidays/No Class:** September 2 (Labor Day); October 18 (Homecoming); November 11 (Veteran's Day); November 25 – 29 (Thanksgiving); December 5 – 6 (Reading Days).

**Final Exam Schedule:** There is no final exam in this course! Instead at the end of the course, we will have evening times set aside for students to watch and present on their final presentation projects (see course schedule).

There is a lot of information in this syllabus, including a detailed lecture/reading/lab/assignment schedule and various rubrics. It will be a useful resource for you throughout the semester.

### INSTRUCTORS AND TEACHING ASSISTANTS<sup>1</sup>

(Note: stated office hours are tentative and will be updated the 1<sup>st</sup> week of classes)

<b>Instructor</b>	<b>Dr. Ashlyn Hale (call me Dr. Hale or Professor Hale)</b>
<b>Phone</b>	352-294-3661 (office CLB412D)
<b>E-mail</b>	<a href="mailto:Ashlyn.rose.hale@ufl.edu">Ashlyn.rose.hale@ufl.edu</a> *Please message me via Canvas!
<b>O.H.</b>	Periods T6, R5 and R6 in CLB412D, or by appointment.

<b>Grad. TA</b>	Zain Becerra, (becerra@ufl.edu), OH: periods xx on Zoom.
<b>TAs</b>	Kate Bass (kate.bass@ufl.edu), OH: period xx on Zoom.
	Mahika Balaraju (mahikabalaraju@ufl.edu), OH: period xx on Zoom.
	Rosenna Chan (rosenna.chan@ufl.edu), OH: period xx on Zoom
	Kelsey Kedroski (kkedroski1@ufl.edu), OH: period xx on Zoom.
	Ehren Towle, (etowle@ufl.edu), OH: period xx on Zoom.
	Saesha Wani (saesha.wani@ufl.edu), OH: period xx on Zoom.

<sup>1</sup>Zoom office hours will take place at

## REQUIRED & RECOMMENDED COURSE MATERIALS (TO PURCHASE/RENT)<sup>2</sup>

### REQUIRED BOOKS:

[PrincipeLM2013] Lawrence M. Principe, 'The Secrets of Alchemy,' The University of Chicago Press, Chicago/IL, 2013, ISBN #978-0-226-10379-2.

Any format is fine.

### RECOMMENDED BOOKS:

[HolmyardEJ1957] Eric John Holmyard, 'Alchemy,' reprinted 1990, Dover Publications, Mineola/NY 1990, ISBN #978-0-48626-298-7.

Reading assignments from this book will be made available to students on canvas at no cost.

### OTHER SOURCE MATERIAL:

**Other source material as listed under 'Readings/Works' will be made available online through canvas at no cost to the student.**

<sup>1</sup> Zoom office hours will take place

<sup>2</sup>Reading materials used in this syllabus will be abbreviated uniformly in square brackets as [<Author Last Name><Initials><Publication Year>]. The full reference is given the first time it appears in the text.

## LAB MATERIALS:

**Approved safety glasses/goggles and proper attire.** You will be asked to leave the lab if you don't show up in proper attire. Rules conform to those used in General Chemistry Labs (**see below**).

You will require a **suitable laboratory notebook**. A **standard composition notebook** is sufficient.



### Lab Safety: Dress Code

This is Mike – and Mike is dressed properly for lab.

- ✓ His hair is tied back.
- ✓ His approved safety glasses are on.
- ✓ His necklace is tucked in.
- ✓ He is wearing a loose-fitting shirt with no holes.
- ✓ His shirt sleeves cover down to the mid-upper arm.
- ✓ His stomach is not exposed.
- ✓ His shirt will cover his torso when he raises his arms.
- ✓ His pants are not tight.
- ✓ His ankles are not showing – there is no gap in coverage between his pants and his shoe.
- ✓ His shoes have no holes and are durable.



## QUEST AND GENERAL EDUCATION CREDIT

- Quest 1                      Humanities (H)                      Writing Requirement (WR) 2000 words

This course accomplishes Quest and General Education objectives and select student learning outcomes (SLOs) as outlined in section IV below. SLOs are the abilities, skills, and knowledge that students will develop by the conclusion of a given course or program of learning.

**A minimum grade of C is required for General Education credit.** Courses intended to satisfy the General Education requirement cannot be taken S-U.

## COURSE DESCRIPTION

Multi-disciplinary exploration of the history of alchemy, the precursor to modern chemistry. Studies the multidimensional relationships with philosophy, religion, and the natural sciences from antiquity to the modern era. Recreation of alchemical recipes in the teaching lab enhance the course content.

## COURSE INFORMATION

This Quest–1 course explores the question of **how we as human beings experience and make sense of the natural world.**

- Who are we in relation to the natural world?
- How have humans understood their role in the natural world and their responsibility to it?
- How do portrayals of nature reflect our values or self-understanding?
- How have we as humans dominated nature and considered ourselves to be part of nature?

It applies a **humanities–based multidisciplinary approach** using the **lenses of history, philosophy, religion, and chemistry to analyze how scientific and philosophical thought is shaped and how it affects culture.** **Alchemy as the pre–cursor of modern chemistry** has been practiced as early as ~300 BCE until it was mostly replaced as a scientific and cultural driving force by modern chemistry about three centuries ago. In their quest for understanding the forces of nature and learning how to harness them, alchemists are similar to modern scientists. However, they were children of their age and worked with the worldviews and biases of their times. Looking at the world through their eyes will help us understand how our own worldviews and biases affect our quest for knowledge and desire to control the natural world. **The history of alchemy with its many secrets draws us to look back and enables us to look forward.**

Students will **read the book ‘The Secrets of Alchemy’ by Dr. Larry Principe** (Drew Professor of History of Science at Johns Hopkins University) to get a historic overview of the four periods of alchemy, the Greco–Egyptian, Arabic, Medieval Latin, and Early Modern eras. To obtain a more comprehensive view the book is **supplemented with further reading material which broadens the discussion.** The additional reading material covers Eastern Alchemy, ancient and modern sources of alchemy, foundational theories, practical aspects, and discusses its impacts on modern society.

The course includes a **laboratory component with six experiments** that will introduce students to some of the methods and techniques used by alchemists in their workshops. This **experiential learning component will help the student to view alchemy through an alchemist’s eyes.**

At the end of the semester students will **give a short conference-style (5 – 7 min) presentation on a topic of their choice** from the various themes and ideas discussed in class and approved by the instructor. The **presentation will be peer-reviewed and (partially) peer-graded.**

**There is no final exam in this course.** Student learning will be assessed through **online discussion posts on Canvas and in Perusall, short pre-lab safety quizzes, written laboratory reports, a written literature review, an analytical essay, and an oral student presentation.**

**Students may choose among different themes for their literature review, essay, and oral presentation.** They may focus on alchemy as a cultural force, or on its historical development as a precursor of modern chemistry, or how alchemical theory was biased by worldviews. Other themes may be the philosophical and religious roots of alchemy or an analysis of the actual chemistry that alchemists practiced in their workshops. **The themes of the students' essays are connected to the essential question addressed in the course.** Students will apply the analytical techniques learned in the course and make connections by reflecting on their own intellectual, personal, and professional development during their time at UF and beyond.

## II. GRADED WORK

Please see the table on the next page for a description of all graded work and the relative points out of the total 1000 points for the course.

Assignment	Description	Requirement	Points
<b>Online Discussion Posts (ODP)</b>	Online Discussion Posts. <b>Canvas:</b> Post questions and ideas you wish to discuss in the discussion meetings pertaining to the weekly readings. Submit on canvas. You will receive a grade on the 10 best out of 13 opportunities. <b>Perusall:</b> post one question and one response each week in one of the assigned Perusall readings.	200 words minimum per week	<b>100</b> <b>(5×10)</b> <b>(5×10)</b>
<b>In-Class Participation Grade (ICP)</b>	Will be earned by actively participating in class during the weekly discussions during weeks 2 through 15. There are 13 opportunities to participate actively. You will receive a grade on the 10 best of these 13 opportunities.	active participation	<b>100</b> <b>(10×10)</b>
<b>Literature Review (LRev)<sup>3</sup></b>	Brief summary and synopsis of a paper from the current literature on the history of alchemy. Students can choose from approx. 20–30 articles provided by the instructor. Submit on canvas.	700–1000 words	<b>100</b> <b>(1×100)</b>
<b>Laboratory Participation (LP) and Pre-lab Safety Quiz (PLS)</b>	Actively participate in the experiential learning portion of the course (alchemy labs), as well as complete the pre-lab safety (PLS) quiz on Canvas.	Pre-lab safety quiz (PLS)  Active laboratory participation (LP)	<b>(6×4)</b> <b>(6×6)</b> <b>60 total</b>
<b>Brief Lab Report (LR) Experiential Learning</b>	Brief report on the laboratory activities. The report should contain an introduction, the purpose of the experiment, a description of what was done, the results and observations for the experiment, and a brief personal reflection. You will receive a grade on the <b>4 best out of 5 lab reports</b> .	3 – 5 pages including figures and figure captions, font size 11 or 12.	<b>200</b> <b>(4×50)</b>
<b>Student Presentation (SP)</b>	5 – 7 minute oral presentation on a topic of student's choice approved by the instructor. <b>Students will present in class during the T11–E1 and W11–E1 lab periods during the last two weeks of the semester.</b> Presentations will be partially peer-reviewed/graded.	5 – 7 min oral presentation	<b>200</b> <b>(1×200)</b>
<b>Final Analytical Essay (FE)<sup>3</sup></b>	Your essay will analyze some of the important questions that were raised in the course. The topic of your essay will have to be approved by your instructor. The topics for the final essay and the student presentation may be the same.	1300 words minimum	<b>240</b> <b>(1×240)</b>
<b>Total:</b>			<b>1000</b>

<sup>3</sup>Note: The Literature Review (LRev) and the Final Analytical Essay (FE) will be graded for the writing requirement.

## ATTENDANCE AND PARTICIPATION:

Requirements for class attendance, make-up 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:** In-class participation will be documented by attendance sheets. Without consistent attendance and in-class participation it will be very difficult for you to succeed in the course.

**Participation:** Consistent informed, thoughtful, and considerate class participation is expected and will be evaluated using the rubric below. The instructor will inform you of your participation grade to date at least every other week and schedule a conference if you are earning below 70% of the possible points.

**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.

## ASSESSMENT RUBRICS AND STATEMENTS

**WRITTEN ASSIGNMENTS: GRADE RUBRIC APPLIES TO ONLINE DISCUSSION POSTS (ODP), LITERATURE REVIEW (LREV), LAB REPORTS (LR), AND FINAL ESSAY (FE).**

	High Quality	Average	Needs Improvement	Unacceptable
<u>Informed</u> : Shows evidence of having read the material	100 % Clearly presents the main idea(s) and supports them well	75 % Supports the main idea(s) mostly throughout the document	50 % Vague sense of main idea(s), weakly supported	0 % Lacks reference to main idea(s), no support within the document
<u>Thoughtful</u> : Shows evidence of having understood the issues raised.	100 % The main issues are engaged clearly and thoughtfully	75 % The main issues are mostly engaged in a clear manner	50 % The main issues are only partly engaged	0 % Lacks engagement of the main idea(s) throughout
<u>Reflective</u> : Provides a component of self-reflection that is sincere.	100 % A thoughtful and strong link between the material and the student's personal or academic progress	75 % A link between the material and the student's personal or academic progress is provided	50 % The link between the material and the student's personal or academic progress is tenuous at best	0 % Lacks any link between the material and the student's personal or academic progress
<u>Complete</u> : Responses are complete and/or consistent with the instructions.  Responses also utilize appropriate grammar	100 % Contains all required components, follows instructions, uses good style and is free of grammatical errors	75 % Contains most of the required components and follows instructions. Style is appropriate and contains very few grammatical errors	50 % Does not contain all required components, only partially follows instructions. Style needs improvement and/or contains relatively many grammatical errors	0 % Does not contain the required components, does not follow instructions. Style is hard to follow and/or the document is full of grammatical errors



**PARTICIPATION: GRADE RUBRIC APPLIES TO IN-CLASS PARTICIPATION (ICP).**

	<b>High Quality</b>	<b>Average</b>	<b>Unacceptable</b>
<b>Informed:</b> Shows evidence of having done the assigned work.	100% Participates actively in an informed discussion	50% Participates only sporadically or participation is not well informed	0% No participation at all or completely oblivious to the discussion topic
<b>Thoughtful:</b> Shows evidence of having understood and considered issues raised.	100% Shows evidence of good understanding of the issues	50% Shows partial evidence of understanding of the issues	0% Lacks evidence of understanding of the issues
<b>Considerate:</b> Takes the perspective of others into account.	100% Shows evidence of considering multiple view points	50% Shows only partial evidence of considering multiple view points	0% Lacks evidence of considering multiple view points

**LABORATORY: GRADE RUBRIC APPLIES TO LABORATORY PARTICIPATION (LP)**

	High Quality	Average	Unacceptable
<u>Informed:</u> Shows evidence of having read the lab manual	100% Has read and understood the lab manual before coming to lab, knows what to do in the lab	50% Has read but only partially understood the lab manual before coming to lab, questions show some understanding of the lab work	0% Shows no understanding of the lab manual and has no clue what is going on in the lab
<u>Careful:</u> Carefully follow experimental steps and pay attention to lab safety.	100% Completely follows directions in a careful manner, requires no intervention by the TAs, doesn't violate any safety rules	50% Follows directions for the most part and requires little intervention by the TAs, does not violate safety rules	0% Does not follow directions or requires constant supervision by the TAs, or violates safety rules
<u>Notes:</u> Careful notes taken during the lab work on procedures and events.	100% All important data is recorded in the notebook, writing is clear and legible	50% Most important data is recorded in the notebook, writing is legible	0% Data is mostly absent from the notebook and/or writing is unintelligible

**PEER GRADING: GRADE RUBRIC APPLIES TO STUDENT PRESENTATIONS (SP) AT THE END OF THE SEMESTER.**

Student presentations (SP) will be peer graded based on the rubric on the next page. Students in the audience will assign points to each speaker during a session based on the quality of the presentation. Student grades will be averaged for each speaker and count for 50% of the presenter's grade. The remaining 50% will come from the instructor's and TAs' assessments of the presentation using the same rubric as the students.

### Student Presentation Rubric for Peer-grading

Presenter Name: \_\_\_\_\_ Presentation Title: \_\_\_\_\_ Date: \_\_\_\_\_

Time presentation began: \_\_\_\_\_ Time presentation ended: \_\_\_\_\_

<b>Criteria</b> <small>(graded on a scale from 1 – 10)</small>	<b>10</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>Pts. earned</b>
<b>Content</b> <small>(accuracy, based on own research, new material, clarity of arguments, personal reflection) (max 40 pts)</small>	Content presented is accurate, based on own research, new material and a meaningful personal reflection is presented; there is a clear logical flow, essential information is emphasized.	Content appears accurate with some evidence of own research and some new material and a brief personal reflection; there is a logical flow to the arguments presented.	Some content facts seem questionable with little evidence of own research and almost no new material presented; personal reflection is questionable; arguments don't follow a logic path.	Content seems questionable; no evidence of own research, no new material presented, no personal reflection; no logical path throughout the presentation.	
<b>Form</b> <small>(Introduction, body, conclusion, and references) (max 40 pts)</small>	Presentation starts with a short and engaging introduction, body contains several well structured points, and ends with a brief rational conclusion and references.	Presentation follows the main structure and has all parts but misses transitions or the parts are out of proportion.	Several important parts (introduction, body, conclusion, references) are missing, out of order, mixed together, or are out of proportion.	No perceptible introduction, body, or conclusion. Reference list is missing.	
<b>Presentation</b> <small>(clarity, audibility, eye contact, verbal fillers) (max 40 pts)</small>	Presenter is articulate, audible to the people in the back row, maintains eye contact with the audience, and avoids verbal fillers (um, uh, er, etc.) and unnecessary pauses while maintaining an engaging flow.	Presenter is audible to all most of the time, maintains eye contact with many in the audience, and uses very few verbal fillers or unnecessary pauses.	Presenter mumbles or is sometimes difficult to hear in the back row, eye contact with the audience is sparse, flow is interrupted by pauses and/or verbal fillers, flow of the presentation is choppy.	Presenter constantly mumbles or speaks so softly that the back row can't hear, eye contact is lacking, speaker reads off text from PowerPoint slides, presentation is constantly interrupted by pauses and/or verbal fillers.	

<b>Visual Aid</b> (engaging, not dominating, neat, creative PowerPoint slides)(max 40 pts)	The visual aid complements the speech and is neat (no typos), colorful, and creative. Text is sparse and has large font for good readability.	The visual aid connects to the speech and is mostly neat, colorful, and creative. Text fonts could be bigger and amount of text less to avoid distraction.	The visual aid somewhat connects to the speech and is somewhat neat and colorful but lacks creativity or dominates the presentation. There is too much text and/or fonts are too small.	The visual aid lacks connection with the presentation and is messy, creativity is lacking, consists of just words.	
<b>Confidence &amp; Attitude</b> (enthusiasm, poise, body language, engaging) (max 20 pts)	Speaks with enthusiasm and poise, body language supports the flow of the presentation, audience is engaged.	Speaks mostly with enthusiasm and poise, body language supports the flow of the presentation most of the time, audience is mostly engaged.	Speaks with some enthusiasm and poise, body language is disconnected from presentation, audience is somewhat engaged.	Speaks with little or no enthusiasm and poise, body language distracts from the flow of the presentation, audience is unengaged.	
<b>Time</b> (max 20 pts)	Speech is within the allotted time (5 - 7 min)	Speech is either too short or too long ( $\pm 30$ sec)	Speech is either too short or too long (5 min $\pm$ 1 min)	Speech is either too short or too long (less than 4 min or has to be stopped because $> 6$ min)	
<b>Total Points:</b>					

**WRITING ASSESSMENT RUBRIC AND STATEMENTS: RUBRIC APPLIES TO THE 2000-WORD WRITING REQUIREMENT (WR)**

- I The Writing Requirement (WR) ensures students both maintain their fluency in writing and use writing as a tool to facilitate learning.
- II The instructor will evaluate and provide feedback before the end of the course on all of the student's written assignments with respect to grammar, punctuation, clarity, coherence, and organization.
- III WR course grades have two components. To receive writing requirement credit, a student must receive a grade of C or higher and a satisfactory completion of the writing component of the course.  
See the next page for the rubric

**WRITING ASSESSMENT RUBRIC: RUBRIC APPLIES TO THE 2000–WORD WRITING REQUIREMENT (WR)**

	<b>SATISFACTORY (Y)</b>	<b>UNSATISFACTORY (N)</b>
<b>CONTENT</b>	Papers exhibit at least some evidence of ideas that respond to the topic with complexity, critically evaluating and synthesizing sources, and provide at least an adequate discussion with basic understanding of sources.	Papers either include a central idea(s) that is unclear or off-topic or provide only minimal or inadequate discussion of ideas. Papers may also lack sufficient or appropriate sources.
<b>ORGANIZATION AND COHERENCE</b>	Documents and paragraphs exhibit at least some identifiable structure for topics, including a clear thesis statement but may require readers to work to follow progression of ideas.	Documents and paragraphs lack clearly identifiable organization, may lack any coherent sense of logic in associating and organizing ideas, and may also lack transitions and coherence to guide the reader.
<b>ARGUMENT AND SUPPORT</b>	Documents use persuasive and confident presentation of ideas, strongly supported with evidence. At the weak end of the Satisfactory range, documents may provide only generalized discussion of ideas or may provide adequate discussion but rely on weak support for arguments.	Documents make only weak generalizations, providing little or no support, as in summaries or narratives that fail to provide critical analysis.
<b>STYLE</b>	Documents use a writing style with word choice appropriate to the context, genre, and discipline. Sentences should display complexity and logical sentence structure. At a minimum, documents will display a less precise use of vocabulary and an uneven use of sentence structure or a writing style that occasionally veers away from word choice or tone appropriate to the context, genre, and discipline.	Documents rely on word usage that is inappropriate for the context, genre, or discipline. Sentences may be overly long or short with awkward construction. Documents may also use words incorrectly.
<b>MECHANICS</b>	Papers will feature correct or error-free presentation of ideas. At the weak end of the Satisfactory range, papers may contain some spelling, punctuation, or grammatical errors that remain unobtrusive so they do not muddy the paper’s argument or points.	Papers contain so many mechanical or grammatical errors that they impede the reader’s understanding or severely undermine the writer’s credibility.

## GRADING SCALE

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

<b>A</b>	<b>94 – 100%</b>		<b>C</b>	<b>74 – 76%</b>
<b>A-</b>	<b>90 – 93%</b>		<b>C-</b>	<b>70 – 73%</b>
<b>B+</b>	<b>87 – 89%</b>		<b>D+</b>	<b>67 – 69%</b>
<b>B</b>	<b>84 – 86%</b>		<b>D</b>	<b>64 – 66%</b>
<b>B-</b>	<b>80 – 83%</b>		<b>D-</b>	<b>60 – 63%</b>
<b>C+</b>	<b>77 – 79%</b>		<b>E</b>	<b>&lt;60</b>

### III. OVERVIEW OF TOPICS

Week	Topic	Lab (T/W T11-E1)
1	Introduction	
2	Greek Chemeia	
3	Arabic Al-Kimiya	Lab #1: Sulfur Water
4	Eastern Alchemy (Chinese): Waidan and Neidan	
5	Eastern Alchemy (Indian): Rasāyana	Lab #2: Transmutation to “Gold”
6	Medieval Latin Alchemia	
7	Golden Age of Alchemy in the Early Modern Period	Lab #3: Prussian Blue and Mauvine Dyes
8	Gold and its Role in Alchemy and Society	
9	Alchemical Workshops	Lab #4: Prussian Blue Nanoparticle Ink and Cochineal Dye
10	Iatrochemistry – the Beginnings of Modern Pharmacology	
11	Wider Context of Alchemy in Culture	Lab #5: Essential Oils by Vapor Distillation
12	Alchemy in the Visual Arts	
13	Women in Alchemy	Lab #6: Tie-dye t-shirts & Make-up labs
14	Alchemy in the Modern World and Student Presentations	
15	Thanksgiving Week (No Classes)	
16	Reading Days Week – Student Presentations	

### III. B ANNOTED WEEKLY SCHEDULE

Week/ Date	Activity	Topic/Assignment	Assigned Work
<b>Week 1</b>		<b>Introduction</b>	
Aug. 22	Syllabus	Introduction: Syllabus, discussion of logistics, introduction of book.	
Aug. 22	Lecture	Overview of Ancient Technology/Chemistry	
<b>Week 2</b>		<b>Greek Chemeia</b>	
Aug. 27	Lecture	Hellenistic Philosophy – The philosophical and theoretical underpinnings of alchemy in the works of Aristotle, Democritos, and the Pythagoreans.	
	Readings/Works	[HolmyardEJ1957] chapter 1, pp. 15 – 24	pages to read: 10
Aug. 29	Lecture	Beginnings of Alchemy, Greco–Egyptian Chemeia. How did alchemy emerge from Greek philosophy?	
	Readings/Works	[PrincipleLM2013] Prolog and Chapter 1, pp. 1 – 26. [DufaultO2015] Transmutation Theory in the Alchemical Corpus, Ambix 62 (2015) 215 – 244.	pages to read: 57



<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Week 3</b>		<b>Arabic Al-Kimiya</b>	
Sep. 03	Assignment	Online discussion post on reading material from prior week and PLS#1 for Lab #1.	ODP #1 and PLS#1 due on canvas at 8:00am.
Sep. 03	In-Class Discussion	Review of 2 <sup>nd</sup> week reading materials and posted discussion points.	ICP #1 in class
Sep. 03/04	Lab #1	Sulfur Water – A recipe from the Greco–Egyptian period (Leyden Papyrus X) to tinge silver with a gold color.	LP #1, lab periods T11-E1/W11-E1
Sep. 05	Lecture	The second wave, Arabic ‘Al-Kimiya.’ How did the Arabs learn about Greek alchemy? How did they reinterpret alchemical theories in light of their own worldviews and the Islamic religion? What new insights did they contribute?	
	Readings/Works	[PrincipeLM2013] Chapter 2, pp. 27 – 50.  [MartelliM2017] Translating Ancient Alchemy: Fragments of Greco–Egyptian Alchemy in Arabic Compendia, Ambix 64 (2017) 326 – 342.	pages to read: 41

<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Week 4</b>		<b>Eastern Alchemy (Chinese): Waidan and Neidan</b>	
Sep. 9	Assignment	Online discussion post on reading material from prior week.	ODP #2 due on canvas at 10:00am
Sep. 10	In-Class Discussion	Review of 3 <sup>rd</sup> week reading materials and posted discussion points.	ICP #2 in class
Sep. 12	Lecture	An independent development, Eastern Alchemy. How did Chinese philosophy lead to alchemical theories? How were they similar and different from those in the western world? What were the goals of Eastern alchemy as opposed to those in the West?	
	Readings/Works	[HolmyardEJ1957] Chapter 3, pp. 33 – 42. [PregadioF2012] The Way of the Golden Elixir – An Introduction to Taoist Alchemy, 2 <sup>nd</sup> ed., Golden Elixir Press 2014.	pages to read: 84
<b>Week 5</b>		<b>Eastern Alchemy (Indian): Rasāyana</b>	
Sep. 16	Assignment	Online discussion post on reading material from prior week.	ODP #3 due on canvas at 10:00am

Week/ Date	Activity	Topic/Assignment	Assigned Work
Sep. 17	Discussion	Review of 4 <sup>th</sup> week reading materials and posted discussion points.	ICP #3 in class
Sep. 17/18	Lab #2	Copper → Silver → Gold. Transmutations in the lab, or so it seems.	LP #2, lab periods T11–E1/W11–E1
Sep. 17/18	Assignment	Lab Reports for Lab #1 and PLS Lab #2 are due at beginning of lab period on canvas.	LR #1 and PLS#2, due on canvas, T10/W10.
Sep. 19	Lecture	The second major branch of Eastern Alchemy, developed on the Indian subcontinent, its relationship with traditional Ayurvedic and Siddha medicine, and its dependence on the Tantric cult. How is Indian Alchemy similar and different from Chinese, Greek, and Islamic Alchemy? What were its goals and achievements?	
	Readings/Works	<p>[WujastykD2017] Acts of Improvement: On the Use of Tonics and Elixirs in Sanskrit Medical and Alchemical Literature, History of Science in South Asia, 5.2 (2017) 1 – 36.</p> <p>[WhiteDG2021] The Ocean of Mercury: An 11<sup>th</sup> Century Alchemical Text, in: Religions of India in Practice, chap. 15, pp. 281 – 287, ed. D. S. Lopez, Princeton University Press, 2021.</p> <p>[ParimalamSS2022] The <i>Siddhars</i>: the great artisans of gold medicines in medieval South India, Advances in Traditional Medicine 22 (2022) 509 – 517.</p>	pages to read: 52

<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Week 6</b>		<b>Medieval Latin Alchemia</b>	
Sep. 23	Assignment	Online discussion post on reading material from prior week.	ODP #4 due on canvas at 10:00am
Sep. 24	Discussion	Review of 4 <sup>th</sup> week reading materials and posted discussion points.	ICP #4 in class
Sep. 26	Lecture	The third wave, medieval Latin 'Alchemia.' What was it that drew European thinkers back to alchemy as they were coming out of the dark ages? What were their sources? How were they able to balance ancient Greek philosophy, pagan roots, Muslim influence, and their own strictly Catholic faith to synthesize new theories and practices? What was the relationship between alchemists and the ruling Catholic Church?	
	Readings/Works	[PrincipeLM2013] Chapter 3, pp. 51 – 82.  [HaaningA2006] The Philosophical Nature of Early Western Alchemy – The Formative Period c. 1150 – 1350, in Art & Alchemy, ed. J. Wamberg, Museum Tusulanum Press, Copenhagen 2006.	pages to read: 49

<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Week 7</b>		<b>Golden Age of Alchemy in the Early Modern Period</b>	
Sep. 30	Assignment	Online discussion post on reading material from prior week.	ODP #5 due on canvas at 10:00am
Oct. 01	Discussion	Review of 5 <sup>th</sup> week reading materials and posted discussion points.	ICP #5 in class
Oct. 01/02	Lab #3	Prussian Blue, an alchemical pigment, and Mauveine, the first industrial chemical dye.	LP #3, lab periods T11–E1/W11–E1
Oct. 01/02	Assignment	Lab Reports for Lab #2 are due at beginning of lab period on canvas. PLS Lab #3 due.	LR #2 and PLS#3, due on canvas, T10/W10.
Oct. 03	Lecture	The Golden Age of Alchemy, Early Modern Period ‘Chymistry.’ Looking back at the early modern period what was the draw that alchemy had for people despite mounting criticisms from the developing science of chemistry? Why did scientists like Isaac Newton or Joseph Boyle practice alchemy while at the same time developing the foundations of modern chemistry and physics? How did scientific knowledge change during this period?	
	Readings/Works	[PrincipeLM2013] Chapter 5, pp. 107 – 136.[PrincipeLM2019] The Development of the Basil Valentine Corpus and Biography: Pseudoepigraphic Corpora and Paracelsian Ideas, Early Science and Medicine 24 (2019) 549 – 572.	pages to read: 54

<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Week 8</b>		<b>Gold and its Role in Alchemy and Society</b>	
Oct. 07	Assignment	Online discussion post on reading material from prior week.	ODP #6 due on canvas at 10:00am
Oct. 8	Discussion	Review of 6 <sup>th</sup> week reading materials and posted discussion points.	ICP #6 in class
Oct. 10	Lecture	Gold and its importance in Alchemy. What are the properties of gold? What basic understanding about gold did the alchemists have? What was the theory behind their attempts to transmute base metals into gold? Was there ever any success? What happened when they failed?	
	Readings/Works	[KauffmanGB1985] The Role of Gold in Alchemy. Parts I – III, Gold Bulletin 18 (1985) 31 – 44, 69 – 78, 109 – 119. [KarpenkoV2007] Not All That Glitters is Gold: Gold Imitations in History, Ambix 54 (2007) 172 – 191.	pages to read: 55
<b>Week 9</b>		<b>Alchemical Workshops</b>	
Oct. 14	Assignment	Online discussion post on reading material from prior week.	ODP #7 due on canvas at 10:00am

<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
Oct. 15	Discussion	Review of 7 <sup>th</sup> week reading materials and posted discussion points.	ICP #7 in class
Oct. 15/16	Lab #4	Prussian Blue, part 2, and Cochineal Dye, a red pigment harvested from farmed bugs in the New World.	LP #4, lab periods T11–E1/W11–E1
Oct. 15/16	Assignment	Lab Reports for Lab #3 are due at beginning of lab period on canvas PLS for Lab#4 due.	LR #3 and PLS #4, due on canvas, T10/W10.
Oct. 17	Lecture	The Secrets of Alchemy. What did the alchemists actually do in their workshop? How can their sometimes mystical writings be interpreted in terms of material processes? What experiments did they carry out and what were their results? How did their work affect the way they generated new theories?	
	Readings/Works	[PrincipeLM2013] Chapter 6, pp. 137 – 171. [MartelliM2011] Greek Alchemists at Work: ‘Alchemical Laboratory’ in the Greco–Roman Egypt, Nuncius 26 (2011) 271 – 311.	pages to read: 76
Oct. 18	Assignment	Literature Review (between 700 and 1000 words) on an article of your choice from a list of articles provided by the instructor.	LRev due on canvas at 6:00pm.

<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Week 10</b>		<b>Iatrochemistry – the Beginnings of Modern Pharmacology</b>	
Oct. 21	Assignment	Online discussion post on reading material from prior week.	ODP #8 due on canvas at 10:00am
Oct. 22	Discussion	Review of 8 <sup>th</sup> week reading materials and posted discussion points.	ICP #8 in class
Oct. 24	Lecture	Iatrochemistry – the turn away from Galen and toward medicinal alchemy and chemistry. What was the theoretical and practical basis for the developments of mineral-based cures? We will look at the persona of Paracelsus, perhaps the most prominent iatrochemist of his time. We will look at the recipe literature and the way that noble women practiced medicinal alchemy.	
	Readings/Works	<p>[HolmyardEJ1957] Chapter 8, pp. 165 – 176.</p> <p>[BernoulliR1994] Paracelsus – physician, reformer, philosopher, scientist, <i>Experientia</i> 50 (1994) 334 – 338.</p> <p>[HedesanG2018] “It All Depends on the Dose” – Poisons and Medicines in European History, ed. O.P. Grell et al., Chap. 5, Routledge 2018.</p>	pages to read: 39



<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Week 11</b>		<b>Wider Context of Alchemy in Culture</b>	
Oct. 28	Assignment	Online discussion post on reading material from prior week.	ODP #9 due on canvas at 10:00am
Oct. 29	Discussion	Review of 9 <sup>th</sup> week reading materials and posted discussion points.	ICP #9 in class
Oct. 29/30	Lab #5	Essential oils by vapor distillation using a copper alembic built after a design by da Vinci and a modern adaptation (to speed up the process).	LP #5, lab periods T11–E1/W11–E1
Oct. 29/30	Assignment	Lab Reports for Lab #4 are due at beginning of lab period on canvas. PLS for Lab #5 due.	LR #4 and PLS#5, due on canvas, T10/W10.

Week/ Date	Activity	Topic/Assignment	Assigned Work
Oct. 31	Lecture	Wider Context of Alchemy in Culture. How did alchemy as an art and as a technology shape culture? Where do we find hints about alchemy in our modern language and thoughts? How did people in the past and now view the profession of the alchemist?	
	Readings/Works	<p>[PrincipeLM2013] Chapter 7 and Epilogue, pp. 173 – 210.</p> <p>[ChaucerG1387] ‘The Canon’s Yeoman’s Tale,’ translated to modern English, accessible at: <a href="https://chaucer.fas.harvard.edu/pages/text-and-translations">https://chaucer.fas.harvard.edu/pages/text-and-translations</a>.</p> <p>[MaierM1618] ‘Atalanta Fugiens,’ translated to English, available as a digital edition, ‘furnace and fugue,’ ed. by Tara Nummedal and Donna Bilak, <a href="https://furnaceandfugue.org/">https://furnaceandfugue.org/</a>, pp. 1 – 50.</p>	pages to read: 97
<b>Week 12</b>		<b>Alchemy in the Visual Arts</b>	
Nov. 04	Assignment	Online discussion post on reading material from prior week.	ODP #10 due on canvas at 10:00am
Nov. 05	Discussion	Review of 10 <sup>th</sup> week reading materials and posted discussion points.	ICP #10 in class

Week/ Date	Activity	Topic/Assignment	Assigned Work
Nov. 07	Lecture	<p>Focus on Alchemy in the visual arts including early depictions of alchemical symbols and apparatuses, emblems and illustrations in alchemical books, engravings, paintings, and surrealistic images. How did alchemy get propagated by pictures? How did popular culture and the artists depict alchemy and alchemists? Were they shown in a positive or negative light? What do we learn from the paintings about the cultural settings in which alchemy was practiced and how it was viewed by the larger population in a given culture?</p>	
	Readings/Works	<p>[PrincipleLM2002] Transmutations: Alchemy in Art – Selected Works from the Eddleman and Fisher Collections at the Chemical Heritage Foundation, Chemical Heritage Foundation, Philadelphia/PA, 2002, pp. 1 – 35.</p> <p>[HeydM1984] ‘Dali’s Metamorphosis of Narcissus Reconsidered,’ <i>Artibus et Historiae</i>, 5 (1984)121 – 131.</p> <p>[DixonLS1981] ‘Bosch’s Garden of Delights Triptych: Remnants of a “Fossil” Science,’ <i>The Art Bulletin</i> 63 (1981) 96 – 113.</p>	pages to read: 70

<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Week 13</b>		<b>Women in Alchemy</b>	
Nov. 12	Assignment	Online discussion post on reading material from prior week.	ODP #11 due on canvas at 10:00am
Nov. 12	Discussion	Review of 11 <sup>th</sup> week reading materials and posted discussion points.	ICP #11 in class
Nov. 12/13	Lab #6  Makeup Lab day	Tie-Dye T-shirt day. We will use our alchemical dyes to make our own T-shirts. No lab report will be necessary for this lab.  Your chance to make up earlier missed and excused labs	LP #6, lab periods T11-E1/W11-E1
Nov. 12/13	Assignment	Lab Reports for Lab #5 are due at beginning of lab period on canvas.	LR #5, due on canvas, T10/W10.
Nov. 14	Lecture	Women in Alchemy. Given the strict gender roles during the times and in the cultures where alchemy was practiced, it is surprising to find female alchemists. What contributions and inventions derive from female alchemists? Why were they interested in alchemy? What challenges did they have to overcome? How was their work received by their contemporaries? What is their legacy?	
	Readings/Works	[RayMK2015] Daughters of Alchemy, Chapter 1 – pp. 15 – 45.  [NummedalTE2001] Alchemical Reproduction and the Career of Anna Maria Zieglerin, Ambix 48 (2001) 56 – 68.	pages to read: 45

<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Week 14</b>		<b>Alchemy in the Modern World and Student Presentations</b>	
Nov. 18	Assignment	Online discussion post on reading material from week 13.	ODP #12 due on canvas at 10:00am
Nov 19	Discussion	Review of 13 <sup>th</sup> week reading materials and posted discussion points.	ICP #12 in class
Nov 19/20	Assignment	5 – 7 min. Student Presentation on a topic of student's choice (has to be approved by instructor), will be peer-graded.	SP in SFH221, T11-E1/W11-E1
Nov 21	Lecture	Alchemy has been rediscovered in popular culture, mostly as a caricature, <i>e.g.</i> , Harry Potter, Fullmetal Alchemist, <i>etc.</i> It still maintains an influence on modern chemistry and psychology but is also present in some forms of pseudo-science, esotericism, and the occult. The transmutation of elements has been achieved by science using large accelerator facilities and new (unstable) elements are still being made and probed. What has survived of alchemy in contemporary pop culture and modern science? How has the picture of the alchemist changed? Are there still people trying to practice it? Have the goals of alchemy been realized by modern technology?	

<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Nov 21</b>	Readings/Works	<p>[PrincipeLM2013] Chapter 4, pp. 83 – 106.</p> <p>[MartinL1975] A History of the Psychological Interpretation of Alchemy, <i>Ambix</i> 22 (1975) 10 – 19.</p> <p>[SherrR1941] 'Transmutation of Mercury by Fast Neutrons,' <i>Physical Review</i> 60 (1941) 473 – 479.</p>	pages to read: 42
<b>Week 15</b>		<b>Thanksgiving Week</b>	
<b>Week 16</b>		<b>Reading Days Week – Student Presentations</b>	
Dec. 02	Assignment	Analytical Essay on topic of student's choice related to the course material (has to be approved by instructor).	Analytical Essay due on canvas at 10:00am.
	Assignment	Online discussion post on reading material from Tuesday.	ODP #13 due on canvas at 10:00am

<b>Week/ Date</b>	<b>Activity</b>	<b>Topic/Assignment</b>	<b>Assigned Work</b>
<b>Week 16</b>		<b>Reading Days Week – Student Presentations</b>	
Dec. 03	Discussion	Review of 15 <sup>th</sup> week reading materials and posted discussion points.	ICP #13 in class
Dec. 03/04	Assignment	5 – 7 min. Student Presentation on a topic of student’s choice (has to be approved by instructor), will be peer-graded.	SP in SFH221, T11–E1/W11–E1
<b>No final exam- Happy Winter Break!</b>			

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## IV. STUDENT LEARNING OUTCOMES (SLOs)

**AT THE CONCLUSION OF THIS COURSE STUDENTS ARE EXPECTED TO HAVE ACHIEVED THE FOLLOWING QUEST-1 AND GENERAL EDUCATION LEARNING OUTCOMES AS FOLLOWS:**

1. By the end of this course students will be able to identify, describe, and explain the history, theories, and methodologies (both theoretical and practical) used by alchemists and natural philosophers to examine what nature is, how it works, and how it can be used to improve the human condition. Students will describe the historical evolution of alchemy over the course of more than two millennia. This includes alchemical processes and apparatuses as well as the classical theories of nature that governed the practical work done in the workshops. They will recognize prominent alchemists and describe their schools of thought (specifically, Zosimos, Jabir, and Paracelsus). (Quest-1 and GE-H Content).

Assessments: Online Discussion Posts, Literature Review, Final Essay, and Student Presentation.

2. By the end of this course students will be able to analyze and evaluate the theories originally established in ancient Greece that provided the basis for natural philosophy throughout the ancient, medieval, and into the early modern periods. Students will analyze and explain how these theories changed over time based on collective experimental evidence. Moreover, students will explain how ancient designs of chemical apparatuses worked and use them to 'see through the eyes of the alchemist' by using or emulating them in the laboratory. (Quest-1 and GE-H Critical Thinking). Assessments: Online Discussion Posts, Laboratory Participation and Lab Reports, Literature Review, Final Essay, and Student Presentation.

3. By the end of this course students will be able to develop and present clear and effective responses to essential questions relevant to the history and philosophy of alchemy in both oral and written forms. (Quest-1 and GE-H Communication). Assessments: Literature Review, Final Essay, and Student Presentation.

4. By the end of this course students will be able to connect course content with critical reflection on their own intellectual, personal, and professional development at UF and beyond by recognizing and clearly expressing how worldviews and biases (religious, cultural, sociological) have shaped the development of scientific theory and experiment in the past and how similar biases are shaping them now. They will identify and evaluate many of the critical scientific and sociological challenges of our world and relate them to their own education and worldviews. (Quest-1 Connection). Assessments: Literature Review, Final Essay, and Student Presentation.



## V. QUEST LEARNING EXPERIENCES

### 1. DETAILS OF EXPERIENTIAL LEARNING COMPONENT

Students will participate and carry out work in the six lab components over the course of the semester. The labs are designed to topically relate to some of the material discussed in class. Students will see the work of the alchemists through their eyes to some extent by following in their footsteps and working on some of their recipes. Each lab requires the writing of a brief lab report which is due two weeks after the lab work has been completed.

### 2. DETAILS OF SELF-REFLECTION COMPONENT

Students will reflect on the reading material provided each week and share their thoughts both through in-class discussion participation as well as by posting discussion paragraphs (ODPs) on canvas. The weekly ODPs require them to make observations on the reading material which will reflect their understanding of the material. They will ask questions that will provide the material for the weekly in-class discussions. In-class discussion will always include questions about the relationship between the historical context and today's world. Deeper self reflection will happen as the student prepares for their end-of-semester presentation (SP) and their Final Essay. Here, they will specifically comment and discuss how the topics impact their own personal and/or professional lives.

## VI. REQUIRED POLICIES

### ATTENDANCE POLICY

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/ugrad/current/regulations/info/attendance.aspx>

### STUDENTS REQUIRING ACCOMMODATION

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

### 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.ua.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.ua.ufl.edu/public-results/>.

### 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.

## **COUNSELING AND WELLNESS CENTER**

Contact information for the Counseling and Wellness Center: <https://counseling.ufl.edu/>, 392–1575; and the University Police Department at 392–1111, or 9–1–1 for emergencies.

## **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.

## **IN–CLASS RECORDINGS**

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited.

Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor–led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.