

## ISC1010C Secrets of Alchemy – Quest 1 (section SOAA, class #21027)

Quest 1 Theme: Nature and Culture

Summer Term A 2024, May 13, 2024 – June 21, 2024.

### I. General Information

Class Meeting Day/Time/Location:

Lecture/Discussion/Lab Periods:<sup>1</sup> MTWR 8:50 am – 11:45 am.

No Class: June 3 (new FUA cycle starts)<sup>2</sup>

Final Exam Schedule: There is no final exam in this course.

### Instructor<sup>3</sup>

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

Instructor	Dr. Alexander Angerhofer (Dr. A)
Phone	+1-352-222-5719
E-mail	<a href="mailto:alex@chem.ufl.edu">alex@chem.ufl.edu</a>
O.H.	Mondays from 1:00 pm – 2:00 pm and by appointment on zoom <sup>3</sup>

### Required & Recommended Course Materials (to purchase/rent)<sup>4</sup>

#### Required Books:

[PrincipleLM2013] 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.

#### Other Source Material:

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

#### Lab Materials:

Safety glasses and gloves will be provided for students. Make sure not to wear shorts or open toed shoes to the lab periods. Wear clothes that you don’t mind getting stained if you happen to spill some of the lab materials on yourself by accident.

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

<sup>1</sup> Note: We typically don’t need the whole time, so class times will vary. We will usually start at 9:30am.

<sup>2</sup> While we won’t have class on June 3, we have a scheduled guided tour on that day.

<sup>3</sup> Zoom office hours will take place at <https://ufl.zoom.us/j/96780015394>.

<sup>4</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.

All UF students are expected to satisfy the UF computing requirement and have access to a computer with an internet connection.

### **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 multi-dimensional 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. We will also attend several guided tours to local sites in Florence where alchemy was practiced during the Renaissance.

### **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 precursor 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 three 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.

Three guided tours are planned for the course. We will visit Palazzo Pitti, Palazzo Vecchio, and the Boboli Gardens. The Medici dukes who built these places were supporters and practitioners of alchemy and we will discover many traces of alchemical thought and practice during these guided tours.

At the end of the semester students will give a short conference-style (10 – 12 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, written laboratory reports, a written literature review, an analytical essay, and 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 questions 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, during their study-abroad in Florence, and beyond.

I am looking forward to spending summer A with you in Florence and introducing you to the secrets of alchemy. If you have further questions, please contact me. Have a great summer!

Sincerely Yours,

Dr. Alexander Angerhofer (Dr. A)

## II. Graded Work

### Description of Graded Work

Assignment	Description	Requirement	Points
Online Discussion Posts (ODP)	Online Discussion Posts. Post questions and ideas you wish to discuss in the discussion meetings pertaining to the weekly readings. Submit on canvas.	200 words minimum per week	100 (5×20)
In-Class Participation Grade (ICP)	Will be earned by actively participating in class during the weekly discussions during week 2 through 5.	active participation	100 (5×20)
Literature Review (LRev) <sup>5</sup>	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	200 (1×200)
Laboratory Participation (LP)	Actively participate in the experiential learning portion of the course (alchemy labs). Labs #2 and #3 will count for 20 points since they take place during the same period.	active laboratory participation	40 (2×20)
Guided Tour Participation (TP) <sup>6</sup>	Actively participate in the three guided tours that are organized for the course in the city of Florence	active participation in guided tours	60 (3×20)
Brief Lab Report (LR) Experiential Learning	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. Labs #2 and #3 will require a combined lab report.	3 – 5 pages including figures and figure captions, font size 11 or 12.	100 (2×50)
Student Presentation (SP)	10 – 12 minute oral presentation on a topic of student's choice approved by the instructor. Students will present in class during the last day of summer A. Presentations will be partially peer-reviewed/graded.	10 – 12 min oral presentation	200 (1×200)
Final Analytical Essay (FE) <sup>5</sup>	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	200 (1×200)
Total:			1000

### Statement on Attendance and Participation

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.

<sup>5</sup> Note: The Literature Review (LRev) and the Final Analytical Essay (FE) will be graded for the writing requirement.

<sup>6</sup> Guided tours start at the tour location at 9:30am. If you are not there in time you may miss the tour. You are responsible to getting to the tour location on your own. The tours take place in locations in the center of Firenze, *i.e.*, in walking distance from your apartments. Check with a classmate for walking together.

**Participation:** Consistent informed, thoughtful, and considerate class participation is expected and will be evaluated using the rubric below. **NOTE:** If you have personal issues that prohibit you from joining freely in class discussion, *e.g.*, extreme 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
<b>Informed:</b> Shows evidence of having read the material	100 % Clearly presents the main idea(s) and supports them well	75 % Supports the main idea(s) for the most part	50 % Vague sense of main idea(s), weakly supported	0 % Lacks reference to main idea(s), no support. arguments
<b>Thoughtful:</b> 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
<b>Reflective:</b> 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
<b>Complete:</b> 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).

	High Quality	Average	Unacceptable
<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	100% Shows evidence of good understanding of the issues	50% Shows partial evidence of understanding of the	0% Lacks evidence of understanding of the

issues raised.		issues	issues
<u>Considerate</u> : 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)

	<b>High Quality</b>	<b>Average</b>	<b>Unacceptable</b>
<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: \_\_\_\_\_

Criteria (graded on a scale from 1 – 10)	10	7	4	1	Pts. earned
<b>Content</b> (accuracy, based on own research, new material, clarity of arguments, personal reflection) (max 40 pts)	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> (Introduction, body, conclusion, and references) (max 40 pts)	Presentation starts with a short and engaging introduction, body contains several well structured points, and ends with a brief rational conclusion and references. I	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> (clarity, audibility, eye contact, verbal fillers) (max 40 pts)	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 (10 - 12 min)	Speech is either too short or too long (± 30 sec)	Speech is either too short or too long (± 1 min)	Speech is either too short or too long (less than 9 min or has to be stopped because > 13 min)	
<b>Total Points:</b>					

Writing Assessment Rubric and Statements: Rubric applies to the 2000–word writing requirement (WR)

	SATISFACTORY (Y)	UNSATISFACTORY (N)
CONTENT	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.
ORGANIZATION AND COHERENCE	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.
ARGUMENT AND SUPPORT	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.
STYLE	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.
MECHANICS	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.



- 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.

### Grading Scale

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

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

### III. Annotated Weekly Schedule<sup>7</sup>

Week/ Date	Activity	Topic/Assignment	Assigned Work
<b>Week 1</b>		<b>Introduction, Greek Chemeia, Arabic Al-Kimiya</b>	
May 13	FUA Orientation	No classes	
May 14	Introduction, Syllabus, and Lecture	Introduction: Syllabus, discussion of logistics, introduction of book, Lecture: Hellenistic Philosophy – The philosophical and theoretical underpinnings of alchemy in the works of Aristotle, Democritos, and the Pythagoreans. Beginnings of Alchemy, Greco–Egyptian Chemeia. How did alchemy emerge from Greek philosophy?	
	Readings/Works	[PrincipeLM2013] Prolog and Chapter 1, pp. 1 – 26. [DufaultO2015] Transmutation Theory in the Alchemical Corpus, <i>Ambix</i> 62 (2015) 215 – 244.	pages to read: 57
May 15	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, <i>Ambix</i> 64 (2017) 326–342.	pages to read: 41
May 16	Lab #1	Copper → Silver → Gold. Transmutations in the lab, or so it seems.	LP #1
<b>Week 2</b>		<b>Eastern Alchemy (Chinese), Medieval Latin Alchemia</b>	
May 20	Assignment	Online discussion post on reading material from prior week.	ODP #1 due on canvas at 8:00 am.
May 20	In-Class Discussion	Review of 1 <sup>st</sup> week reading materials and posted discussion points.	ICP #1 in class
May 21	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	

<sup>7</sup> All listed times are Central European Time (CET), *i.e.*, the local time in Florence, Italy.

Week/ Date	Activity	Topic/Assignment	Assigned Work
		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
May 22	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
May 23	Assignment	Lab Reports for Lab #1 are due on canvas at 8:00 am.	LR #1, due on canvas, 8:00 am.
May 23	Lab #2/#3	Cochineal Dye, a red pigment harvested from farmed bugs in the New World. Essential oils through vapor distillation.	LP #2
<b>Week 3</b>		<b>Golden Age of Alchemy in the Early Modern Period, Alchemy in Florence</b>	
May 27	Assignment	Online discussion post on reading material from prior week.	ODP #2 due on canvas at 8:00am
May 27	Discussion	Review of 2 <sup>nd</sup> week reading materials and posted discussion points.	ICP #2 in class
May 28	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	

Week/ Date	Activity	Topic/Assignment	Assigned Work
		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
May 29	Guided Tour	Palazzo Pitti, 9:30 am – 11:30 am	TP #1
May 30	Assignment	Lab Reports for Labs #2 and #3 are due on canvas at 8:00 am.	LR #2/3, due on canvas, 8:00 am.
May 30	Lecture	Alchemy in Florence. The Medici dukes were enthusiastic supporters and practitioners of alchemy. They hired alchemists to carry out experiments in their labs, they traded in alchemical secrets. We will look at the activities of several members of the Medici family as well as some important alchemists of the period.	
	Readings/Works	[KiefferF2014] The Laboratories of Art and Alchemy at the Uffizi Gallery in Renaissance Florence. In: S. DuPre, Laboratories of Art, Archimedes 37, Springer 2014, pp. 105 – 127. [HedesanGD2022] Alchemy and Paracelsianism at the Casino di San Marco in Florence, Nuncius 37 (2022) 119 – 143.	pages to read: 48
May 30	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 6:00 pm.
<b>Week 4</b>		<b>Alchemical Workshops, Iatrochemistry</b>	
June 03	Assignment	Online discussion post on reading material from prior week.	ODP #3 due on canvas at 8:00am
June 03	Guided Tour	Palazzo Vecchio, 9:30 am – 11:30 am.	TP #2
June 04	Discussion	Review of 3 <sup>rd</sup> week reading materials and posted discussion points.	ICP #3 in class

Week/ Date	Activity	Topic/Assignment	Assigned Work
June 05	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, <i>Nuncius</i> 26 (2011) 271 – 311.	pages to read: 76
June 06	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	[HolmyardEJ1957] Chapter 8, pp. 165 – 176. [BernoulliR1994] Paracelsus – physician, reformer, philosopher, scientist, <i>Experientia</i> 50 (1994) 334 – 338. [HedesanG2018] “It All Depends on the Dose” – Poisons and Medicines in European History, ed. O.P. Grell et al., Chap. 5, Routledge 2018.	pages to read: 39
<b>Week 5</b>		<b>Gold and its Role in Alchemy and Society, Women in Alchemy</b>	
June 10	Assignment	Online discussion post on reading material from prior week.	ODP #4 due on canvas at 8:00 am
June 10	Discussion	Review of 4 <sup>th</sup> week reading materials and posted discussion points.	ICP #4 in class
June 11	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?	

Week/ Date	Activity	Topic/Assignment	Assigned Work
	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
June 12	Guided Tour	Boboli Gardens, 9:30 am – 11:30 am.	TP #3
June 13	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 6</b>		<b>Wider Context of Alchemy in Culture and Art, Alchemy in the Modern World</b>	
June 17	Assignment	Online discussion post on reading material from prior week.	ODP #5 due on canvas at 8:00 am
June 17	Discussion	Review of 5 <sup>th</sup> week reading materials and posted discussion points.	ICP #5 in class
June 18	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? What were the 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	

Week/ Date	Activity	Topic/Assignment	Assigned Work
		alchemy was practiced and how it was viewed by the larger population in a given culture?	
	Readings/Works	[PrincipeLM2013] Chapter 7 and Epilogue, pp. 173 – 210. [PrincipeLM2002] 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.	pages to read: 73
June 19	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?	
	Readings/Works	[PrincipeLM2013] Chapter 4, pp. 83 – 106. [MartinL1975] A History of the Psychological Interpretation of Alchemy, <i>Ambix</i> 22 (1975) 10 – 19. [SherrR1941] ‘Transmutation of Mercury by Fast Neutrons,’ <i>Physical Review</i> 60 (1941) 473 – 479.	pages to read: 42
June 20	Assignment	Analytical Essay on topic of student’s choice related to the course material (has to be approved by instructor).	Essay due on canvas at 8:00 am.
June 20	Assignment	10 – 12 min. Student Presentation on a topic of student’s choice (has to be approved by instructor), will be peer-graded.	SP. during Class Time

#### 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). They will understand the influence of alchemy on the Italian Renaissance, particularly the city of Florence and the court of the Medici dukes. They will be able to identify alchemical symbols and tools within the wealth of historical records stored in museums and public sites in their study-abroad location. (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 to the study-abroad site (Florence) 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. Through guided tours at various historic sites, students will get insights and form connections between today’s world and the early Renaissance, its philosophical and religious foundations, and its attempts to understand the world through experiments on nature. (Quest-1 Connection). Assessments: Literature Review, Final Essay, and Student Presentation.
5. By taking the course abroad in the city of Florence, students will be confronted by actual artifacts of the topic of study, *e.g.*, the alchemical laboratories and apparatuses of the Medici court, creative works derived from the activities and ideas of scientists of the time, and historical literary records. They will experience how Italy as a nation is steeped in its cultural and historic heritage. Through interaction with local tour guides, faculty, and students, they will realize how the Italian Renaissance is still alive in modern Italy.



## V. Quest Learning Experiences

### 1. Details of Experiential Learning Component

Students will participate and carry out work in the three lab components over the course of the term. 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 one week after the lab work has been completed.

Since the course will be held in the city of Florence, there will be three guided tours to sites where alchemical work was done during the Renaissance period. Students will learn about the materials and the apparati that were used by the Medici dukes and their hired alchemists.

### 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. Specific emphasis will be placed on the development of alchemy in the city of Florence, Italy. Students will reflect on how Hellenistic philosophy and Christian religious thought fueled the Italian Renaissance and how it in turn laid the foundation for the subsequent Enlightenment period and our modern philosophy of science. The students literature review will provide them with an opportunity to understand and reflect on the practical applications of alchemy at the ducal courts of the Medici in Florence. Deeper self reflection will happen as the student prepares for their end-of-term 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.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/>.

### 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/>.

### 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/> for information, 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.