Term Information

Effective Term	Spring 2018

General Information

Course Bulletin Listing/Subject Area	Chemistry
Fiscal Unit/Academic Org	Chemistry - D0628
College/Academic Group	Arts and Sciences
Level/Career	Undergraduate
Course Number/Catalog	2990
Course Title	Intro to Chemical Research
Transcript Abbreviation	Intro to Research
Course Description	A seminar course targeting chemistry majors focusing on the development of professional skills, conducting literature searches, writing research papers, and exploring careers and research options.
Semester Credit Hours/Units	Fixed: 1

Offering Information

Length Of Course	14 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Seminar
Grade Roster Component	Seminar
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Chemistry 1220/1620/1920H (Gen Chem 2) AND ENGLISH 1110
Exclusions	

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	40.0501
Subsidy Level	Baccalaureate Course
Intended Rank	Sophomore, Junior, Senior

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Students will better understand how a research paper is constructed, by authoring a research paper with proper structure, grammar, publication-quality figures, and citations.
- Students will improve their skills in conducting literature searches and organizing their references by executing a literature search on a research topic, and utilizing a reference manager for organizing and building a list of references.
- Students will better understand plagiarism and writing ethics through discussing the importance of ethical conduct in publications and discussing examples of unethical conduct.
- Students will discover the exciting chemical research being conducted as The Ohio State University by attending research presentations given by faculty conducting chemical research and explaining aspects of their projects.
- Students will investigate chemistry career options by attending and participating in career discussions.

Content Topic List

- Plagiarism discussion
- Conducting literature searches
- Parts of a Research Paper
- Writing an Outline, Begin Paper
- Making Figures
- Faculty Research Presentations
- Paper Q&A
- Career Discussion

Attachments

- Sp18- CHEM 2990 Syllabus.docx: Syllabus

  (Syllabus. Owner: Sutherland,Laura Nicolle Romrell)
- BA in Chemistry Sample Curriculum Plan.docx: CHEM-BA: Curriculum Map

  (Other Supporting Documentation. Owner: Sutherland,Laura Nicolle Romrell)
- BS in Chemistry Sample Curriculum Plan.docx: CHEM-BS: Curriculum Map

  (Other Supporting Documentation. Owner: Sutherland,Laura Nicolle Romrell)

Comments

- Revised CHEM-BA and CHEM-BS curriculum map(s) are attached. *(by Sutherland,Laura Nicolle Romrell on 03/10/2017 12:22 PM)*
- If this course can count for your major(s), please provide updated curriculum map(s). *(by Vankeerbergen,Bernadette Chantal on 03/02/2017 06:09 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Sutherland,Laura Nicolle Romre	03/02/2017 12:45 PM	Submitted for Approval
Approved	Gustafson,Terry Lee	03/02/2017 01:00 PM	Unit Approval
Approved	Haddad,Deborah Moore	03/02/2017 04:24 PM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	03/02/2017 06:10 PM	ASCCAO Approval
Submitted	Sutherland,Laura Nicolle Romre	03/10/2017 12:23 PM	Submitted for Approval
Approved	Gustafson,Terry Lee	03/10/2017 12:31 PM	Unit Approval
Approved	Haddad,Deborah Moore	03/10/2017 12:36 PM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler	03/10/2017 12:36 PM	ASCCAO Approval

THE OHIO STATE UNIVERSITY

CHEMISTRY 2990 – Spring 2018

Introduction to Chemical Research

Lecture: Day, Time, Room, (1 credit hour)

Instructor:	Dr. Nicole M. Karn
Email:	karn.38@osu.edu
Office:	MP 2029
Office Hours:	TBA
Textbook:	**Write Like a Chemist: A Guide and Resource** by Marin Robinson, Fredricka Stoller, Molly Costanza-Robinson.
Materials:	Additional materials can be found on the course Carmen page.

Prerequisites: CHEM 1220/1620/1920H (General Chemistry 2) and ENGL 1110

Description: A seminar course targeting chemistry majors focusing on the development of professional skills, conducting literature searches, writing research papers, and exploring careers and research options.

Course Goals and Learning Objectives:

Course Goals	Learning Objectives
Students will better understand how a research paper is constructed.	Author a research paper with proper structure, grammar, publication-quality figures, and citations.
Students will improve their skills in conducting literature searches and organizing their references.	Execute a literature search on a research topic. Utilize a reference manager for organizing and building a list of references.
Students will better understand plagiarism and writing ethics.	Discuss the importance of ethical conduct in publications and discuss examples of unethical conduct.
Students will discover the exciting chemical research being conducted at The Ohio State University.	Attend research presentations given by faculty conducting chemical research and explain aspects of their projects.
Students will investigate chemistry career options.	Attend and participate in career discussions.

Disability Services (SLDS): Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614-292-3307, slds@osu.edu; slds.osu.edu.

THE OHIO STATE UNIVERSITY

Commitment to Diversity: The Department of Chemistry and Biochemistry promotes a welcoming and inclusive environment for all students and staff, regardless of race, gender, ethnicity, national origin, disability or sexual orientation. There is no tolerance for hateful speech or actions. All violations of this policy should be reported to the OSU Bias Assessment and Response Team (BART, studentaffairs.osu.edu/bias). The Department encourages diversity at all levels, particularly among the next generation of scientists. Students are encouraged to participate in organizations that provide support specifically for science and engineering students who are African-American, Asian, disabled, Hispanic, LGBTQ or women. These organizations are listed on the Colleges of Arts and Sciences (artsandsciences.osu.edu/stem-organizations) and Engineering (engineering.osu.edu/studentorgs) websites.

Student Responsibility: Each student receives this syllabus in the first week of the term. It is your responsibility to read this material and be familiar with the course content, procedures, and grading. You are also responsible for any announcements made in class and on Carmen concerning course procedures. (If you are absent, you are expected to get notes, announcements, etc. from another student in the class.)

Carmen | carmen.osu.edu: Carmen is the Learning Management System (LMS) used in this course. It utilizes an LMS engine called Canvas. Log in to Carmen on your device to access the course materials, turn in select assignments, view your grades, and track your progress throughout the semester. A Canvas app is also free to download for both Android and iOS, making it easy to log in to your course from anywhere.

Grading: Your performance in the course will be evaluated based on a research paper, peer reviews, participation, attendance, and additional assignments. The Carmen page has a full list of the assignments and point values. Any concerns about your grades or performance should be addressed with your instructor promptly. No assignment will be "regraded" more than two weeks after the student has received a grade or feedback.

Item	Percent
Research Paper Outline	10
Research Paper Rough Draft	15
Research Paper Peer Comments	15
Research Paper Final Draft	30
Additional Assignments	20
Participation/Attendance	10

Grade Scale (%):

93 - 100	A	73 - 76.9	C
90 - 92.9	A-	70 - 72.9	C-
87 - 89.9	B+	67 - 69.9	D+
83 - 86.9	B	60 - 66.9	D
80 - 82.9	B-	Below 60	E
77 - 79.9	C+		

THE OHIO STATE UNIVERSITY

Attendance Policy: Students can miss two class periods without an effect on the course grade. For every absence beyond two, the final grade will be reduced by 1/3 of a letter grade (i.e. B becomes a B-). Any participation points will be forfeited in the case of an absence.

Late Assignments: Late assignments are penalized 5% per day (35% per week).

Course Schedule:

Week 1	Syllabus and Course overview, Plagiarism discussion by Dennis Learning Center or COAM representative
Week 2-3	Conducting Literature Searches, overview of search engines, reference managers, assignment
Week 4-6	Parts of a Research Paper
Week 7	Writing an Outline, Begin Paper
Week 8	Making Figures
Week 9-12	Faculty Research Presentations, Rough Draft Due (week 10), Peer Review Due (week 11)
Week 13	Paper Q and A, FAQs
Week 14-15	Career Discussion
Finals week	Paper due

STANDARDS OF ACADEMIC CONDUCT

Violations of academic standards in Quantitative Chemical Analysis will be referred to the University Committee of Academic Misconduct (COAM) as required by Faculty Rules. It is the responsibility of COAM to investigate all reported cases of student academic misconduct; illustrated by, but not limited to, cases of plagiarism and any dishonest practices in connection with examinations, quizzes, and graded assignments. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information see the Code of Student Conduct: **http://studentaffairs.osu.edu/pdfs/csc_12-31-07.pdf** and the COAM page on the course Carmen site.

Student Responsibilities: *Any graded material submitted in this course must represent your own work.* This includes papers, outlines, reviews and assignments which are to be an individual effort. Resources must be properly cited in all submitted work. Unauthorized group efforts by students, use of another student's course materials, or assistance from individuals who already have taken the course, could place you in jeopardy of violation of the standards for this course. In some courses, group work is acceptable on certain activities (as explicitly stated by your instructor). In these cases, it is important that you know and understand where authorized collaboration (working in a group) ends and collusion (working together in an unauthorized manner) begins. Identical answers indicate copying or unacceptable group efforts - always answer questions in your own unique words. It is important that you consult with your instructor for clarification on whether or not collaboration is appropriate on an activity.

You should not assist others in violating academic standards. Students supplying materials for others to "look at" may be charged with academic misconduct. Never allow another student access to your assignments – even after completion of the course. "I didn't know they were going to copy my work" is not an acceptable excuse.

The Bachelor of Arts Degree in Chemistry (B.A.)

The Bachelor of Arts curriculum is intended for students who want a background in Chemistry as a basis for future work in other areas of science, such as the life sciences, or in professional areas such as medicine, pharmacy or veterinary science.

- General Chemistry 1610–1620 and Organic Chemistry 2610–2620 are the recommended sequences for chemistry and biochemistry majors, although qualified students are urged to take Honors sequences instead.
- Chemistry 1612 & 1622 are highly recommended. They provide a structure in which students can work actively in groups of 6 to 8 peers to enhance learning.
- The major is completed with **nine (9) hours of advanced science electives**, which must include **at least three (3) hours of upper level chemistry or biochemistry coursework.**

Examples of some approved science electives include:

- Chem 2990 (Intro to Research - 1)
- Chem 3510 (Inorganic - 3)
- Chem or Biochem 4998/4999 (Research)
- Chem 5420 (Organic Spectroscopy - 1.5)
- Chem 5430 (Carbohydrates - 3)
- Chem 5440 (Computational - 3)
- Chem 5520 (Nanochemistry - 3)
- Biochemistry 4511 (4)
- Microbiology 4000 (4)
- Molecular Genetics 4500 (3)
- Most 2000-4000 level courses in Mathematics
- Other non-required graded Chem and Biochem 4000-6000 level courses
- Approved 4000-6000 level courses in Microbiology, Molecular Genetics, Physics, Food Science, and EEOB

- Undergraduate Research (Chem or Biochem 4998/4999) is recommended. A maximum of six (6) hours of research may be used to fulfill the requirements of the major. Intro to Research (Chem 2990) is a 1 credit optional elective with pre-requisites of Gen Chem 1+2 and English 1110. This course offers early exposure to the professional skills needed to conduct research.

Autumn Semester (Year 1)		Spring Semester (Year 1)	
General Chemistry 1 (1910H, 1610, 1210)	5	General Chemistry 2 (1920H, 1620, 1220)	5
PLTL in Gen Chem (1612)	1	PLTL in Gen Chem (1622)	1
Calculus 1 (Math 1151)	5	Calculus 2 (Math 1152)	5
GE Elective	3-4	GE Elective (*Biology 1113*)	4
Freshman Survey	1	GE Elective	3
	15-16		18
Autumn Semester (Year 2)		**Spring Semester (Year 2)**	
Analytical Chemistry 1 (2210)	5	Organic Chemistry 2 (2920H, 2620, 2520)	4
Organic Chemistry 1 (2910H , 2610, 2510)	4	Organic Chemistry Laboratory 2 (2550)	2
Organic Chemistry Laboratory 1 (2540)	2	Physics 2 (1201 or 1251)	5
Physics 1 (1200 or 1250)	5	GE Elective	3
	16		14
Autumn Semester (Year 3)		**Spring Semester (Year 3)**	
Physical Chemistry 1 (Biochem 5721)	3	Physical Chemistry 2 (Biochem 5722)	3
Advanced Science Elective (Chem/Biochem)	3-4	Physical Chemistry Laboratory (4410)	3
Elective	3	Elective	3
GE Elective	4	GE Elective	4
GE Elective	3	GE Elective	3
	16-17		16
Autumn Semester (Year 4)		**Spring Semester (Year 4)**	
Advanced Science Elective	3	Advanced Science Elective	3
Elective	3	Elective	3
Elective	3	GE Elective	3
GE Elective	3-4	GE Elective	3
		GE Elective	3
	12-13		15

The Bachelor of Science Degree in Chemistry (B.S.)

The Bachelor of Science curriculum is designed for students seeking to become professional chemists.

- General Chemistry 1610–1620 and Organic Chemistry 2610–2620 are the recommended sequences for chemistry and biochemistry majors, although qualified students are urged to take Honors sequences instead.
- Chemistry 1612 & 1622 are highly recommended. They provide a structure in which students can work actively in groups of 6 to 8 peers to enhance learning.
- The major is completed with **six (6) hours of advanced science electives**, which must include **at least three (3) hours of upper level chemistry or biochemistry coursework.**

Examples of some approved science electives include:

- Chem 2990 (Intro to Research - 1)
- Chem or Biochem 4998/4999 (Research)
- Chem 5420 (Organic Spectroscopy - 1.5)
- Chem 5430 (Carbohydrates - 3)
- Chem 5440 (Computational - 3)
- Chem 5520 (Nanochemistry - 3)
- Biochemistry 4511 (4)
- Most 4000 or 5000 level courses in Physics
- Most 4000 or 5000 level courses in Mathematics
- Other non-required graded Chem and Biochem 4000-6000 level courses

- Undergraduate Research (Chem or Biochem 4998/4999) is recommended. A maximum of six (6) hours of research may be used to fulfill the requirements of the major. Intro to Research (Chem 2990) is a 1 credit optional elective with pre-requisites of Gen Chem 1+2 and English 1110. This course offers early exposure to the professional skills needed to conduct research.
- Students who wish to receive an American Chemical Society certified degree should include Biochemistry 4511 or 5613 and an advanced laboratory experience in Inorganic Chemistry (4550) or Biochemistry (5621).

Autumn Semester (Year 1)		**Spring Semester (Year 1)**	
General Chemistry 1 (1910H, 1610, 1210)	5	General Chemistry 2 (1920H, 1620, 1220)	5
PLTL in Gen Chem (1612)	1	PLTL in Gen Chem (1622)	1
Calculus 1 (Math 1151)	5	Calculus 2 (Math 1172)	5
GE Elective	3-4	GE Elective (*e.g. Biological Science*)	4
Freshman Survey	1	GE Elective	3
	14-15		17
Autumn Semester (Year 2)		**Spring Semester (Year 2)**	
Organic Chemistry 1 (2910H , 2610, 2510)	4	Organic Chemistry 2 (2920H, 2620, 2520)	4
Organic Chemistry Laboratory 1 (2540)	2	Organic Chemistry Laboratory 2 (2550)	2
Physics 1, calculus based (1250)	5	Physics 2, calculus based (1251)	5
Integrals & Differential Equations (Math 2177)	4	Analytical Chemistry 1 (2210H, 2210)	5
	15		16
Autumn Semester (Year 3)		**Spring Semester (Year 3)**	
Physical Chemistry 1 (4300)	3	Physical Chemistry 2 (4310)	3
Inorganic Chemistry (3510)	3	Physical Chemistry Laboratory (4410)	3
Advanced Science Elective (Chem/Biochem[a])	3-4	Analytical Chemistry 2: Instrumental Analysis (4870)	3
Elective	3	Adv. Lab (Chem 4998/Inorg. 4550/Biochem 5621[a])	2-4
GE Elective	3	GE Elective	4
	15-16		15-17
Autumn Semester (Year 4)		**Spring Semester (Year 4)**	
Advanced Science Elective	3	Elective	3
Laboratory Practice in Instrumental Analysis (4880)	2	GE Elective	3
GE Elective	3	GE Elective	3
GE Elective	3	GE Elective	3
GE Elective	3-4	GE Elective	3-4
	14-15		15-16

[a]Biochemistry 4511 & Biochemistry 5621 = 4 credit hours

[a]Biochemistry 4511 & Biochemistry 5621 = 4 credit hours