

# SCI 397 B & C: Entering Research 1 & 2

## Fall 2017 - Spring 2018

**Instructor:** Nathan Lysne

**Day and Time:** TBD

**Room:** Kuiper 301

### **Instructors:**

Nathan Lysne, Graduate Student, Dept. Physics

Meinel Optical Sciences Building, Room 568, 1630 E. University Blvd

[nlysne@email.arizona.edu](mailto:nlysne@email.arizona.edu) or (520)626-3304

Ali Bramson, Graduate Student, Dept. Planetary Science

Kuiper Space Sciences, Room 318, 1629 E. University Blvd

[bramson@lpl.arizona.edu](mailto:bramson@lpl.arizona.edu) or (520)621-1471

### **Student Learning Objectives**

The *Entering Research* workshop's student learning objectives and course goals support and complement the student research experience. To achieve the goals, students should concurrently enroll in the workshop and actively engage in a research experience.

Through concurrent participation in a research experience and the *Entering Research* workshop, students will engage with foundational and professional aspects of scientific disciplines. After the course students will be able to:

1. establish a positive relationship with their mentor by agreeing on common goals and expectations for the research experience.
2. define their roles and responsibilities as a member of their research group.
3. explain the focus of their group's research, how individual research group members and projects are connected, and how the research contributes new knowledge to the discipline.
4. relate their research to their current and previous coursework.
5. define a research question.
6. find and evaluate relevant primary literature and background information related to their research question.
7. connect their research to issues relevant to society at large.
8. define and contribute to discussions about the forms and consequences of scientific misconduct.
9. construct a testable hypothesis.
10. design experiments to test their hypothesis.
11. learn and use techniques needed to support their experiments.
12. appropriately document their research.
13. effectively communicate their research findings in oral and written scientific formats.
14. contribute to peer review and explain the role of peer review in science.
15. identify and secure future research positions with suitable mentors.

This course an Engaged Learning course. It is designed to guide students through experiential learning and reflection on that experience to prepare students for applying what they've learned beyond the classroom and into their future careers. Students that complete the course with a C or better will earn the notation 'Engaged Learning Experience: Completed' on their UA transcripts, and the completion of this course will also appear on their Student Engagement Record.

This course has been designated with the following Engaged Learning attributes:

Engagement Activity: Professional Development

Engagement Competency: Professionalism

## **Grading**

Attendance is required. Grades will decrease with each unexcused absence. Please let me know before class if you cannot make it. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean designee) will be honored.

Total grades will be calculated based on the following:

10% - Attendance

50% - In-Class Discussion & Participation

40% - Written assignments & proposal/poster/peer review feedback/presentations

Total grades will correspond to the standard letter grade scheme below:

A: 90% and above      B: 80-90%      C: 70-80%      D: 60-70%      E: Below 60%

## **Student Guidelines**

### **Reading and Materials:**

There are no required texts or materials. Some sessions may include reading assignments that will be handed out in class or a URL will be provided for online reading.

**Extracurricular (outside of scheduled classroom) time:** It is assumed that students will also be conducting independent research concurrently with the course. One assignment may involve visiting another student's research group and another involves interviewing a person with a career you are interested in exploring. These are expected to be done outside of class time but should not take more than an hour.

### **In Class Behavior:**

This class relies on class participation and discussion for everybody to get the most out of it. Please be on time to class and stay until the end to get full attendance points and maximum benefit out of the class. To fully participate it is necessary that students refrain from using their cell phones and laptops unless beneficial to the class discussion (i.e. having an online reading assignment open on a laptop). Disruptive behavior and/or threatening behavior will not be tolerated. Disruptive behavior is defined as conduct that interferes with the learning process or diverts resources away from the goals of the class. This can range from a student who consistently comes late to class to ringing cell phones. Threatening behavior is any conduct, statement, gesture, etc that causes apprehension of harm to a person or property within the University of Arizona community.

### **Cheating, plagiarism and academic integrity:**

Everyone will have a different experience as they participate in research. It is expected that each student will turn in their own work. The UA Code of Academic Integrity can be found at [http://deanofstudents.arizona.edu/sites/deanofstudents.arizona.edu/files/code\\_of\\_academic\\_integrity.pdf](http://deanofstudents.arizona.edu/sites/deanofstudents.arizona.edu/files/code_of_academic_integrity.pdf) and the Arizona Board of Regents (ABOR) Student Code of Conduct can be found at <http://deanofstudents.arizona.edu/studentcodeofconduct>. Cheating and plagiarism are violations of these codes and can carry severe penalties at the University level. There is the expectation that students will maintain a high standard of academic integrity.

### **Accessibility and Accommodations:**

It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish

reasonable accommodations. Please be aware that the accessible table and chairs in the classroom should remain available for students who find that standard classroom seating is not usable.

**Note on Syllabus Changes:** This syllabus provides an outline of the goals and expectations of the course. However, dates, deadlines and topics may change. If it changes, an updated syllabus will be emailed to all enrolled students.

# Entering Research Part I (Fall 2017)

## Seminar Description

This 1-credit seminar course for undergraduate students is the first in a series, designed to complement the beginning of an independent research experience. Students meet weekly to share their research experiences and to get feedback on the progress of their research projects as they learn about the roles, responsibilities, and relationships that make for a successful research experience.

Week of:	Topics	Assignments Due
<b>Session 0 (Before start)</b>	<b>Find a Research Mentor</b>	
<b>August 28</b>		
<b>September 5</b>		
<b>Session 1 September 22</b>	<b>Introductions Research Expectations</b>	
<b>Session 2 September 29</b>	<b>Nature of Science Searching the Literature for Scientific Articles</b>	<ul style="list-style-type: none"> <li>• Research Experience Expectations</li> <li>• Personal Statement</li> </ul>
<b>Session 3 October 6</b>	<b>Reading Scientific Articles</b>	<ul style="list-style-type: none"> <li>• Scientific Article Critique</li> </ul>
<b>Session 4 October 13</b>	<b>Your Research Group's Focus</b>	<ul style="list-style-type: none"> <li>• Your Research Group's Focus</li> </ul>
<b>Session 5 October 17</b>	<b>Establishing Goals &amp; Expectations with Your Mentor</b>	<ul style="list-style-type: none"> <li>• Mentor Biography</li> <li>• Summary of Expectations</li> </ul>
<b>Session 6 October 20</b>	<b>Who's Who in Your Research Group</b>	<ul style="list-style-type: none"> <li>• Research Group Diagram</li> </ul>
<b>Session 7 October 27</b>	<b>Defining Your Hypothesis or Research Question</b>	<ul style="list-style-type: none"> <li>• Background Information &amp; Hypothesis or Research Question</li> </ul>
<b>Session 8 October 31</b>	<b>Designing Your Experiments</b>	<ul style="list-style-type: none"> <li>• Experimental Design &amp; Potential Results with Timeline</li> </ul>
<b>Session 9 November 3</b>	<b>Peer Review Process</b>	
<b>November 10</b>	<b>No Class (Veteran's Day)</b>	
<b>Session 10 November 14</b>	<b>Research Proposal Peer Reviews</b>	<ul style="list-style-type: none"> <li>• Research Proposal Draft #1</li> </ul>
<b>Session 11 November 17</b>	<b>Future Plans, Summer Research Opportunities (REU application process)</b>	<ul style="list-style-type: none"> <li>• Personal Statement</li> </ul>
<b>November 24</b>	<b>No Class (Thanksgiving)</b>	Will Reschedule Towards End of Term
<b>Session 12 December 1</b>	<b>Research Proposal Peer Reviews</b>	<ul style="list-style-type: none"> <li>• Research Proposal Draft #2</li> </ul>
<b>Session 13 December 8</b>	<b>Final Presentations, Survey &amp; Seminar Evaluation</b>	<ul style="list-style-type: none"> <li>• Final Research Proposal</li> <li>• Poster of Proposal</li> </ul>

# Entering Research Part II (Spring 2018)

## Seminar Description

This 1-credit seminar course is the second of a two-part series that begins with Entering Research, Part I. This class meets weekly and is designed to enhance and support the student's continuing research experience as they learn about communicating science, the peer review process and presenting their results.

Dates	Topics	Assignments Due
<b>Session 15</b> February 13	<b>Science &amp; Society</b>	
<b>Session 16</b> February 15	<b>Science Communication</b>	<ul style="list-style-type: none"> <li>• Read "Communicating Science" by Hendrix</li> </ul>
<b>Session 17</b> February 20	<b>Introduction to Abstracts</b>	<ul style="list-style-type: none"> <li>• Research Project Outline &amp; Science Abstract</li> </ul>
<b>Session 18</b> February 27	<b>Abstract Review</b>	<ul style="list-style-type: none"> <li>• Reflecting on Your Mentoring Relationship</li> </ul>
<b>March 5-9</b>	<b>SPRING BREAK</b>	
<b>Session 19</b> March 13	<b>Effective Scientific Presentations</b>	<ul style="list-style-type: none"> <li>• Final Public Abstract</li> <li>• Scientific Poster Hunt</li> </ul>
<b>Session 20</b> March 20	<b>Peer Review</b>	<ul style="list-style-type: none"> <li>• Presentation Draft #1</li> </ul>
<b>Session 21</b> March 27	<b>Outside Review</b>	<ul style="list-style-type: none"> <li>• Presentation Draft #2</li> </ul>
<b>Session 22</b> April 3	<b>Research Careers</b>	<ul style="list-style-type: none"> <li>• Researching Research Careers</li> </ul>
<b>Session 23</b> April 10	<b>Introduction to Funding/Grants</b>	<ul style="list-style-type: none"> <li>• Your Research Group's Funding</li> </ul>
<b>If Applicable</b>	<b>Present at Space Grant Symposium: April 13-14</b>	
<b>Session 24</b> April 17	<b>Curriculum Vitae</b>	<ul style="list-style-type: none"> <li>• Research Ethics</li> </ul>
<b>Session 25</b> April 24	<b>Peer Review of Mini-Grant Proposal</b>	<ul style="list-style-type: none"> <li>• Draft of Mini-Grant</li> </ul>
<b>Session 26</b> May 1	<b>Presentations, Research Experience &amp; Seminar Reflection/Evaluation</b>	<ul style="list-style-type: none"> <li>• Final Mini-Grant</li> <li>• Final Presentation</li> </ul>
<b>Session 27</b> <b>Finals Week</b>	<b>Presentations, Research Experience &amp; Seminar Reflection/Evaluation</b>	<ul style="list-style-type: none"> <li>• Final Mini-Grant</li> <li>• Final Presentation</li> </ul>