STS 205: Intro to Research Methods – Honors

Mon/Wed 10-11:20am, Honors College 210

SYLLABUS DRAFT 9/7/23 – SUBJECT TO REVISION

Instructor: Dr. Julia Hyland Bruno
Contact: julia.hylandbruno@njit.edu
Office hour: Tues 10-11am or by appointment, Cullimore 313

FACULTY MENTORS

Dr. Phil Barden [Biological Sciences]
Dr. Mark Cartwright [Informatics]
Dr. Britt Holbrook [Philosophy]
Dr. Elisa Kallioniemi [Biomedical Engineering]
Dr. Burcak Ozludil [ADHC]
Dr. Yelda Semizer [Cyberpsychology]
Dr. Kristen Severi [Biological Sciences]
Dr. Petras Swissler [Mechanical & Industrial Engineering]
Dr. Genoa Warner [Chemistry & Environmental Science]

PREREQUISITES

ENGL 102 with a grade of C or higher.

COURSE DESCRIPTION

This course is intended to give first and second year undergraduate honors students an understanding of what research is, what it is used for, how it is conducted, and how it is reported. It provides an overview of applying the scientific method to real-life research, including ethical concerns, qualitative and quantitative methods (and how and when they should be used), and how to critically evaluate published research findings. Students work with faculty mentors on research projects, while writing proposals for the support of future research.

LEARNING OUTCOMES

By the end of this course, students will be able to:

- Identify a research problem
- Identify and mitigate ethical issues associated with a research project
- Conduct a thorough literature review and critique published research
- Develop research questions and hypotheses
- Determine which type of data is most appropriate to answer the research questions
- Assess multiple formats for organizing, developing, and presenting research
- Develop a research network and understand how to communicate with faculty, graduate students, peers, etc. about research.

COURSE MATERIALS

Readings: Required readings include assigned articles related to the faculty mentor research programs, and student project-driven independent reading. In addition, optional readings will be made available to supplement the topics in research methods covered in the course.

Canvas: The Canvas course site will be used to disseminate readings as well as for class-wide communication.

Technology: We will be using Google docs regularly during class; please bring a laptop or tablet to all class meetings (discuss with me if this is an issue).

COURSE STRUCTURE & REQUIREMENTS

The course consists of three interrelated phases.

In the *research foundations* phase (weeks 1-4), students are introduced to research through interactions with and intensive study of the active research programs of the nine faculty members serving as course mentors.

The heart of the course is the *lab practicum*, in which students complete independent research projects under the supervision of a faculty mentor. During the lab practicum (weeks 5-13), students are expected to spend the majority of their in-class as well as out-of-class time working on their independent research projects. Students and faculty mentors jointly decide on a topic and schedule for the independent research. Students are responsible for crafting their own

research questions, conducting independent reading in their topic, and documenting their reading and project activities in lab notebooks.

The final weeks of the course are devoted to *project consolidation*, in which students share their research through poster presentations, and write research proposals based on their lab practicum projects.

Students are encouraged to meet with me regularly to help stay on track with their projects.

Course requirements are worth the following percentages of your final grade:

- CITI Responsible Conduct of Research course: 5%
- Class preparation/attendance/participation including faculty mentor reading response questions and peer review work: 25%
- Faculty mentor evaluation: 10%
- Independent research project: 60%
  - Project plan: 5%
  - Lab notebook: 15%
  - Poster and presentation: 20%
  - Annotated bibliography: 10%
  - Research proposal: 10%

Detailed grading rubrics will be provided for all assignments. Attendance is required. Due to the interactive and iterative nature of the assignments, in general late submission of course work will not be accepted.

Letter grades will be determined using the following scale:

Percentage	**Letter (description)**
90 and above	A (superior)
85 – 89	B+ (excellent)
80 – 84	B (very good)
75 – 79	C+ (good)
70 – 74	C (acceptable)
60 – 69	D (minimum)
59 and below	F (inadequate)

Any extenuating circumstances that could interfere with your ability to complete the requirements for this course must be taken to the Dean of Students Office. The Dean of Students will discuss your situation with you, assess any relevant documentation, and make the determination of whether

any special accommodations will be granted (e.g., late withdrawal from the course, request for an extension, request for an Incomplete, etc.).

ACADEMIC INTEGRITY

NJIT requires me to include this language:

> ***Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.***
>
> *Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office.* ***Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.*** *If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.*

ACCESSIBILITY/ACCOMODATIONS/COUNSELING SERVICES

If you anticipate any issues related to the format or materials of this course, or if you would like to discuss any accommodations that might be helpful, please contact me at the start of the semester. If you have a documented disability, or if you think you might have a disability, you should also be in touch with the Office of Accessibility Resources and Services (OARS), either to request an official accommodation or to discuss requesting one. More information about OARS is available here: https://www.njit.edu/accessibility/.

The Center for Counseling and Psychological Services (C-CAPS) provides a number of confidential resources for any student interested in seeking help with personal issues, emotional concerns, or stress. Visit https://www.njit.edu/counseling/ to learn more.

SCHEDULE

KEY:
*** meet in the classroom**
Out of class assignments (due before the start of class unless otherwise noted)
Lab notebook entries (minimum weekly, due Friday 11:59pm)
In-class assignments (due by the end of class)

WK	DATE	TOPIC	READING	ASSIGNMENT
WEEKS 1-4: RESEARCH FOUNDATIONS				
1	***9/6**	**Introduction to research and class procedures**		• **Create lab notebook**
2	***9/11**	**Choosing a research project** • Research questions and methods in my field • Faculty mentor guest lecture: Dr. Cartwright	• Cartwright et al., 2019 • Cartwright et al., 2023	• **Cartwright reading q's**
	***9/13**	**Choosing a research project** • Faculty mentor guest lecture: Dr. Ozludil • Faculty mentor guest lecture: Dr. Swissler	• Ozludil reading • Swissler & Rubenstein, 2022	• **Ozludil reading q's** • **Swissler reading q's**
	• **CITI certifications due Fri 9/15 11:59pm**			
3	***9/18**	**Choosing a research project** • Faculty mentor guest lecture: Dr. Warner • Faculty mentor guest lecture: Dr. Holbrook	• Schug et al., 2016 • Holbrook reading	• **Warner reading q's** • **Holbrook reading q's**
	***9/20**	**Choosing a research project** • Faculty mentor guest lecture: Dr. Barden • Faculty mentor guest lecture: Dr. Semizer	• Fiorentino et al., 2023 • Semizer & Michel, 2019	• **Barden reading q's** • **Semizer reading q's**
4	***9/25**	**Choosing a research project** • Faculty mentor guest lecture: Dr. Severi • Faculty mentor guest lecture: Dr. Kallioniemi	• Severi reading • Valero-Cabré et al., 2017	• **Severi reading q's** • **Kallioniemi reading q's**
	***9/27**	**Preparing to join labs** • The scientific method • Ethics and values in research	Optional readings	

WK	DATE	TOPIC	READING	ASSIGNMENT
	• Mentor preferences due Fri 9/29 11:59pm			
WEEKS 5-13: LAB PRACTICUM				
5	***10/2**	**Research design: questions, hypotheses, and methods**	Optional readings	
	***10/4**	**Knowledge gaps and directed reading**	Independent reading	• **Create Zotero library**
	• ***Lab notebook: week 5 activities***			
6	***10/9**	**Independent research plan workshop**	Independent reading	• **Project plan** • **Project plan peer reviews**
	10/11	No class (independent research)	Independent reading	• **Revised project plan**
	• ***Lab notebook: week 6 activities***			
7	10/16	No class (independent research)	Independent reading	
	10/18	No class (independent research)	Independent reading	
	• ***Lab notebook: week 7 activities***			
8	***10/23**	**Lab practicum check-in** • Lab notebook show and tell • Peer support/trouble-shooting	Independent reading	
	10/25	No class (independent research)	Independent reading	
	• ***Lab notebook: week 8 activities***			
9	10/30	No class (independent research)	Independent reading	
	11/1	No class (independent research)	Independent reading	
	• ***Lab notebook: week 9 activities***			
10	11/6	No class (independent research)	Independent reading	
	***11/8**	**Scientific communication workshop part 1: preparing a conference poster**	Independent reading	
	• ***Lab notebook: week 10 activities***			
11	11/13	No class (independent research)	Independent reading	
	***11/15**	**Scientific communication workshop part 2: writing a research proposal**	Independent reading	

WK	DATE	TOPIC	READING	ASSIGNMENT
				• ***Lab notebook: week 11 activities***
12	***11/20**	**OPTIONAL Rough draft workshop**	Independent reading	
	11/22	No class [FRIDAY SCHEDULE]		
				• ***Lab notebook: week 12 activities***
13	***11/27**	**OPTIONAL Rough draft workshop**	Independent reading	
	***11/29**	**OPTIONAL Rough draft workshop**	Independent reading	
				• ***Lab notebook: week 13 activities***
WEEKS 14-finals: PROJECT CONSOLIDATION				
14	***12/4**	**Poster presentations**	Independent reading	• **Poster (final)** • **Poster peer reviews**
	***12/6**	**Poster presentations**	Independent reading	• **Poster peer reviews**
15	***12/11**	**Poster presentations**	Independent reading	• **Poster peer reviews**
	***12/13**	**Poster presentations**	Independent reading	• **Poster peer reviews**
				• **Annotated bibliography/Zotero library (final) due Fri 12/15 11:59pm**
				• **Proposal (final) due Mon 12/18 11:59pm**