STS 205: Intro to Research Methods - Honors Tuesday & Thursday 8:30-9:50AM Honors College 210

Instructor: Emily Tancredi-Brice Agbenyega

Email: et279@njit.edu Office: Honors College 229 Office Hours: Mondays 2-4PM or by appointment Prerequisites: ENGL (HUM) 101 and 102 or equivalent.

Faculty Mentors:

Sagnik Basuray (Chemical Engineering) Wenbo Cai (Industrial Engineering) James Geller (Computer Science) Alison Lefkovitz (History) William Pennock (Civil Engineering) Hai Phan (Data Science) Gretchen Von Koenig (HCAD) Mengjia Xu (Data Science)

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.

Objectives:

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

- Define science
- 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 (qualitative or quantitative) 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

Required Readings:

- Excerpts from the following text:
 Dixon, Jeffrey, Singleton, Royce, and Straits, Bruce (2019). The Process of Social Research. New York: Oxford UP. ISBN 9780190876654
- Articles and/or book chapters assigned by faculty mentors
- Independent reading for research project

Course Requirements:

Research Project: 80%

- Faculty Mentor Reading Response 5%
- Lab notebook 10%
- Research Proposal 35%
 - Background section draft 10%
 - Significance section draft 5%
 - Methodology section draft 5%
 - Expected Outcomes/Deliverables section draft 5%
 - Complete Proposal draft 10%
 - Peer review 5%
 - Revised final Proposal 10%
- HIRF Poster Presentation 15%
- Faculty Mentor Evaluation 10%
- Project Reflection 5%

Students will write a standard research proposal, following URI/HIRF proposal guidelines, for their own original research project. Students will select a research topic at the beginning of the semester. During the practicum, students will work with their faculty mentors, in collaboration with the course instructor, to design a research project that explores a particular area of interest within their selected topic. Students will have the opportunity to present their research proposals at the Honors Interdisciplinary Research Forum (HIRF) in April, 2025.

CITI Responsible Conduct of Research course: 5%

Course Participation / Attendance: 15%

Late Assignment Submissions: All late assignments will be accepted only if an extension is requested *prior* to the due date. Assignments will not be accepted more than 1 week late.

Paper Formatting: All papers should be written in APA style, including the following criteria: typed, double-spaced, 12 pt standard font (Times, Helvetica, Arial, etc), 1" margins. For digital submission, only the following file types are accepted: pdf, doc, docx.

Grading Scale (for assignments only, course grades will not include: A+, A-, B-, C-, D+):

| 96-100 | A+ |
|--------|------------|
| 93-95 | Α |
| 89-92 | A - |
| 86-88 | В+ |
| 83-85 | В |
| 79-82 | В- |
| 76-78 | C+ |
| 73-75 | С |
| 69-72 | C- |
| 66-68 | D+ |
| 60-65 | D |
| 0-60 | F |

Academic Integrity:

Students are expected to follow the University Code on Academic Integrity. Plagiarism will not be tolerated. All cases of suspected plagiarism/cheating will be reported for investigation. For details, see: <u>http://www.njit.edu/academics/integrity.php</u>

Generative AI Use

Student use of artificial intelligence (AI) is permitted in this course for certain assignments and activities at the instructor's discretion. If and when students use AI in this course, the AI must be cited as is shown within the <u>NJIT Library AI citation page</u> for AI. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.

Laptops and other technology rules:

Students may use laptops, tablets, cell phones, or other technology in this course for classrelated activities only. Texting, using Twitter, playing games, etc. interrupts the flow of discussion, distracts other students, and will inevitably embarrass you when I have to call you out. Students are prohibited from using headphones. Be present and prepared when you are here. If you would rather text or surf the internet, please do not come to class.

Students with Disabilities or Special Needs:

Students who have disabilities or special needs should contact NJIT's Student Disability Services to help procure accommodations in completing coursework. The center can be found at <u>http://www.njit.edu/counseling/services/disabilities.php</u>.

Land Acknowledgement

I acknowledge and honor that I am teaching on the ancestral homeland and territory of the Munsee Lenape peoples, communities, and nation and recognize the longstanding significance of these lands for these nations past and present.

| WEEKS 1-5: RESEARCH FOUNDATIONS | | | | |
|---------------------------------|---------------|---|---|--|
| WК | CLASS DATE | ΤΟΡΙϹ | READING | ASSIGNMENT Due Sunday by 11:59PM unless otherwise noted |
| 1 | *1/21 | Introduction to Class and Overview of Scientific Research | | Create lab notebook |
| | *1/23 | Overview of Scientific Research Methods | Dixon, Singleton, and Straits, chapter 2 ("Science and Social Research") Bring any scientific article of your choice to class (paper or electronic copy) | |
| 2 | *1/28 | Choosing a research project Faculty mentor guest lecture: <u>William Pennock</u> <u>Hai Phan</u> | Guest lecture articles | Pennock reading q's Phan reading q's |
| | *1/30 | Choosing a research project Faculty mentor guest lectures: <u>Mengjia Xu</u> <u>Sagnik Basuray</u> | Guest lecture articles | Xu reading q's Basuray reading q's |
| 3 | *2/4 | Choosing a research project Faculty mentor guest lectures: <u>Gretchen Von Koenig</u> James Geller | Guest lecture articles | Von Koenig reading q's Geller reading q's |

| | *2/6 | Choosing a research project | Guest lecture articles | Lefkovitz reading q's |
|---|----------------|---|---|--|
| | | Alison Lefkovitz | | |
| | | Introduction of CITI Training | | |
| 4 | *2/11 | Choosing a research project | | |
| | | Faculty mentor guest lecture: | Guest lecture articles | Cai reading q's |
| | | <u>Wenbo Cai</u> | | |
| | *2/13 | Preparing to join labs | | Meeting with |
| | | Research Design – pt. 1 (Overview) | Dixon et al., 2019 (chap. 4) | prospective mentors |
| | | | | |
| | | | Schedule meetings with prosp | ective mentors |
| | | | | |
| 5 | *2/18 | Preparing to join labs Research Design — Part 2 (Research questions, hypotheses, and methods) | Dixon et al., 2019 (chaps. 5 & 7) | Meeting with prospective mentors |
| 5 | *2/18 *2/20 | Preparing to join labsResearch Design – Part 2 (Research questions, hypotheses, and methods)Preparing to join labs Research Ethics | Dixon et al., 2019 (chaps. 5 & 7) Dixon et al., 2019 (chap. 3) | Meeting with prospective mentors Meeting with prospective mentors |

| WEEKS 6-15: LAB PRACTICUM | | | | |
|---------------------------------|---------------------------------|---|------------------------|---|
| WК | CLASS DATE | ΤΟΡΙϹ | READING | ASSIGNMENT Due Sunday by 11:59PM unless otherwise noted |
| 6 | *2/25 | Research Proposal Workshop – Part 1 Research Topic Selection | Independent reading | Research plan draft & peer reviews |
| | *2/27 | Research Proposal Workshop – Part 2: Knowledge gaps and directed reading Background Section (Intro. & Literature Review) | Independent reading | Create Zotero library Faculty Mentor Reading Response |
| | | | Lab notebook | : Week 6 activities |
| 7 | 3/4 | No class (independent research) | Independent reading | |
| | 3/6 | No class (independent research) | Independent reading | |
| | | | Lab notebool | k: Week ⁊ activities |
| 8 | *3/11 | Lab practicum check-in Lab notebook show and tell • Peer support/trouble-shooting | Independent reading | |
| | 3/13 | No class (independent research) | Independent reading | Background Section Draft |
| | Lab notebook: Week 8 activities | | | |
| Spring Break: March 16-23, 2025 | | | | |

| 9 | *3/25 | Class – Option 1 (choose 1) Research Proposal Workshop – Part 3 Significance, Methods, Expected Outcomes/Deliverables, Peer Review guidance | Independent reading | |
|----|----------------------------------|--|------------------------|---|
| | *3/27 | Optional class – Option 2 (choose 1) Research Proposal Workshop – Part 3 Significance, Methods, Expected Outcomes/Deliverables, Peer Review guidance | Independent reading | Significance, Methods, and Expected Outcomes/ Deliverables - Draft |
| | | | Lab notebook: | Week 9 activities |
| 10 | 4/1 | No class (independent research) | Independent reading | |
| | 4/3 | No class (independent research) | Independent reading | Proposal Draft & Peer Review |
| | | | Lab notebook: V | Veek 10 activities |
| 11 | *4/8 | HIRF Poster Presentation Workshop – Option 1 (choose 1) | Poster prep. | |
| | *4/10 | HIRF Poster Presentation Workshop — Option 2 (choose 1) | Poster prep. | Poster Draft |
| | Lab notebook: Week 11 activities | | | |
| 12 | *4/15 | HIRF Poster Presentation Practice Session – Round 1 | Poster revisions | |
| | 4/17 | No class (independent research) | Poster Presentation | Poster Abstract & Final Poster |
| | | | Lab notebook: | Week 12 activities |

| 13 | *4/22 | HIRF Poster Presentation Practice Session – Round 2 | Poster Presentation | | |
|----|---|---|------------------------|---|--|
| | 4/24 | No class (individual presentation prep.) | | | |
| | Final Practicum Meetings & Faculty Mentor Evaluations HIRF, Friday, April 25 th 11:30 AM -1:00 PM | | | | |
| 14 | *4/29 | Research Proposal Workshop – Part 4 | | | |
| | | Research Proposal Revisions | | | |
| | *5/1 | Research Proposal Workshop – Part 5 Individual meetings | | Final Research Proposal & Faculty Mentor Evaluations | |
| 15 | *5/6 | Last Day of Class – Research Project Reflection | | Research Project Reflection (due by end of class, 5/6) | |

Helpful Links

• The NJIT Undergraduate Research and Innovation Program's website has information aimed at the undergraduate researcher. The research proposal assignment for this course will follow the formatting and content instructions for the NJIT Provost Summer Undergraduate Research and Innovation Program. Alternatively, with permission of the instructor, the proposal can follow the guidelines for the Undergraduate Research and Innovation Student Grant. http://centers.njit.edu/uri/programs/index.php

• To participate in research at NJIT, certain safety-related training courses offered by Environmental Health and Safety may be required. Students are encouraged to attend both the "Lab Safety Training" AND the "Biological Safety and BBP Training" at the beginning of the Spring 2020 semester. The course schedule can be found at the following link: <u>http://www.njit.edu/environmentalsafety/training-0/</u>

• NJIT offers the Collaborative Institutional Training Initiative (CITI) Program to provide online, interactive courses on topics related to research (administration, ethics, safety). The CITI course on the "Responsible Conduct of Research"

(<u>https://about.citiprogram.org/en/series/responsible-conduct-of-research-rcr/</u>) is required as a way of providing thorough training on research ethics.