

GMS 6848: Ensuring Rigor and Reproducibility in Clinical and Translational Research

SEMESTER: Summer A, 2019

FORMAT: Online, Synchronous (through Canvas)

CREDITS: 1

COURSE WEBSITE: CANVAS GMS 6848

INSTRUCTORS:

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Online Office Hours (through Canvas): Tuesdays 3-4pm

COURSE PREREQUISITES: GMS 6861 (Applied Biostatistics I), or equivalent

COURSE OVERVIEW:

This course introduces the principles and practices required to conduct rigorous and reproducible research across the translational spectrum. Rigor and reproducibility are quite appropriately receiving greater emphasis across all levels of research, and are receiving greater attention from scientific journals and funders of research alike. At the National Institutes for Health (NIH), rigor and reproducibility are being promoted in their guidance to grant applicants as well as grant reviewers (<https://grants.nih.gov/reproducibility/index.htm>). The NIH is in fact implementing policies “requiring formal instruction in scientific rigor and transparency to enhance reproducibility for all individuals supported by institutional training grants, institutional career development awards, or individual fellowships.” (<https://grants.nih.gov/grants/guide/notice-files/NOT-OD-16-034.html>). Thus, it is essential that researchers understand best practices in research to ensure rigor and reproducibility of their research. In this course, students learn these best practices, including sound study planning and design, consideration of all relevant biomedical variables, sound data management practices, statistical considerations and techniques, and transparency in reporting research results.

COURSE OBJECTIVES:

Teaching methods include readings, lecture (including audio and slides), online forum discussion, and assessment. Upon successful completion of this course, students should be able to:

- Understand the importance of rigor and reproducibility in research across the translational spectrum
- Identify key characteristics, strengths, and weaknesses of various study designs necessary to ensure scientific rigor
- Recognize key biomedical variables necessary for a given research question
- Implement best practices in data collection and management
- Understand the importance of selecting appropriate data analysis techniques to ensure reproducible results
- Report and present results from a research study in a fully transparent manner

COURSE SCHEDULE (TENTATIVE):

Week	Dates (2019)	Topic	Quiz	Assignment
1	5/13-5/17	Introduction; General overview/motivation on rigor and reproducibility in research	1	
2	5/20-5/24	Study design considerations across the translational spectrum	2	
3	5/28-5/31	Selecting all relevant biomedical variables	3	
4	6/3-6/7	Data collection and management: best practices	4	
5	6/10-6/14	Analyzing data to ensure reproducibility	5	Final Assignment
6	6/17-6/21	Transparency in research reporting	6	due 6/20 (11:59pm EST)

TEXTBOOKS/READING MATERIALS:

A selection of scientific publication(s) and article(s) will be assigned to read each week; each publication will be chosen to highlight the content of that particular module and will be discussed in the weekly discussion forum. Students are responsible for any content from the assigned readings posted in the weekly module folder. If material is required from the text this will be explicitly stated in the weekly reading folder. Quizzes may cover any course content covered in assigned readings, and lectures.

The following are suggested *general reference materials*; however, they are not required. Those available in a digital format are posted on canvas in the course resources folder.

REFERENCES:

- Williams M., Curtis M., Mullane K. *Research in the Biomedical Sciences: Transparent and Reproducible* (1st edition). Elsevier, 2017.
- Popper K. *The Logic of Scientific Discovery* ([available online](#)).
- Guidelines for Transparency and Openness Promotion (TOP) in Journal Policies and Practices. https://osf.io/ud578/?_ga=1.211230620.829898984.1435325845
- *Nature* Editorial. Journals Unite for Reproducibility. <http://www.nature.com/news/journals-unite-for-reproducibility-1.16259>
- *Nature* Special Article Collection. [Challenges in Irreproducible Research](#).
- Collins, FS, Tabak, LA. Policy: [NIH plans to enhance reproducibility](#). *Nature*. 505, 612–613. (30 January 2014)
- McNutt M. [Reproducibility](#). *Science*. 343, 229 (17 January 2014)
- Clayton JA. [Studying both sexes: a guiding principle for biomedicine](#). *FASEB J*. Vol.30, No.2, pp: 519-524. (February 2016).

COURSE REQUIREMENTS: Students are expected to actively engage in weekly discussions, complete readings posted to Canvas, view recorded lecture slide decks with paired audio, and complete weekly quizzes and a final assignment. A computer with high-speed Internet connectivity, ability to read/review/edit Microsoft files, ability to read/review pdf files, and a working webcam and microphone are required to effectively complete all course components.

COURSE COMMUNICATIONS:

General course questions should be posted to the discussion board on Canvas. We will respond to discussion posts within 24 hours during the workweek (48 hours over the weekend). Private or grade related questions should be sent to us via the email function in Canvas. The e-learning canvas site follows the rules and regulations of FERPA. Using the email function in Canvas, select both instructors and any teaching assistants as recipients, and include the course mnemonic, GMS6848, in the subject line (to facilitate a more timely response).

ATTENDANCE:

Success in this course is dependent on your active participation and engagement throughout the course. As such, students are required to complete all quizzes and assignments by the due date, and to actively participate in class discussions posts.

OFFICE HOURS:

Online “office hours” will be held on a weekly basis throughout the term via Canvas. We also are available via email. For those who wish to meet via phone/web conference, please email the instructors to arrange a time.

GRADE COMPOSITION:

Students’ final grades will be determined via a variety of assessments, specifically: weekly discussions, quizzes, and a final assignment.

Assessment Description	Points Possible	% of Grade
Weekly Discussion Participation		
<ul style="list-style-type: none"> Contribution to discussion of assigned weekly publication(s) via Canvas online forum Students are required to actively engage in <u>four separate discussion sessions</u> 	40 pts (i.e. 10 pts each)	10%
Weekly Quizzes		
<ul style="list-style-type: none"> There will be weekly quizzes administered online via Canvas; 6 in total 	120 pts (i.e. 20 pts each)	60%
Final Independent Written Assignment		
<ul style="list-style-type: none"> Critique of a Scientific Publication Due 06/20/2019 11:59pm EST 	40 pts	20%
Total Points Possible:	200 pts	100 %

WEEKLY DISCUSSIONS:

Each week, students will be asked to read one or more articles that highlights the content for that particular module/week. A discussion forum on Canvas will be available each week. Students will be asked to provide meaningful discussion to the forum **in four of the six weeks** during the course by commenting on various aspects of the articles or responding to others’ comments.

QUIZZES:

There is an online quiz associated with each module that students will complete throughout the course. Quizzes will be posted to the module on Mondays; students will need to complete the quiz by the following Sunday (the quiz must be completed by Sunday at 11:59pm EST). Each module's quiz will consist of focus on the course content covered in that particular module. Each quiz will consist of 10 questions intended to assess depth of understanding of the material; students will have 30 minutes once they begin the quiz to complete it. Students are strongly encouraged to find a time when they complete the quiz without interruption, as there will not be an opportunity to pause the quiz once the student begins taking it. Quizzes are administered via Canvas and students should take the quiz in an environment with a dependable internet connection. Quizzes cannot be retaken and unanswered questions will receive a score of zero points.

FINAL ASSIGNMENT:

Critique of a Scientific Publication

The final assignment will utilize a scientific publication that analyzes a publically available dataset, both provided to the student by the instructor. In general, students will be asked to review with a critical eye the dataset (provided), and associated manuscript. They will identify whether or not it is possible to replicate the study based solely on the methods described in the publication, and provide clear justification. Further, they will be asked to identify the strengths and weaknesses of each section of the manuscript and how the researchers did or did not provide sufficient detail to ensure their work was rigorous, transparent, and reproducible. Detailed instructions will be provided with the assignment, along with a grading rubric.

DUE: 06/20/2019 11:59pm EST

COURSE LOGISTICS:

- Weekly module materials along with recorded lectures will be posted to the course Canvas site by noon (12:00pm) on Mondays.
- Weekly quizzes will become available on Canvas, Mondays at noon (12:00pm) following the weekly schedule along with course materials and are due Sunday at 11:59pm.
- Regular office hours are noted in this syllabus for Dr. Gurka and Ms. Filipp.
- The final assignment will become available on Canvas on Monday June 10th at noon (12:00pm) and is due via Canvas June 20th 11:59pm.

ASSIGNMENT/QUIZ/DISCUSSION RULES:

- All assigned work must be turned in no later than 11:59 pm EST on the day that it is due.
- Late assignments will NOT be accepted.
- Quizzes are open for completion days before the due date, and instructions for discussions and the final assignment will be provided at the beginning of the course. Please plan accordingly.
- Handwritten assignments will not be accepted.
 - Assignments are to be completed and uploaded as word documents.
 - PDF documents will not be accepted.
- All assignments **must** be submitted electronically via Canvas (will be clarified at the beginning of the course).
- DO NOT COPY OTHERS' ASSIGNMENTS. There is zero-tolerance for academic dishonesty. The one who copies the assignment will receive 0 points; and the one who is copied will get only 50% of the points that he/she should have received.
- You can work with others (e.g., discuss, consult, etc.) on an assignment. If you work on an assignment with other students in the course, you are required to list their names when you turn in the assignment. Plagiarism will receive 0 points.
- Searching for a solution on the web and then submitting it as your answer for an assignment will be considered a violation of the academic honesty policy.

ATTENDANCE POLICY:

Please note all faculty are bound by the UF policy for excused absences. For information regarding the UF Attendance Policy, see the Registrar website for additional details:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

GMS 6848 GRADING SCALE:

Total Points Earned	% of Total Points Earned	Letter Grade	Grade Point Equivalent
186 +	> 93	A	4.0
180-185	90-92	A-	3.67
174-179	87-89	B+	3.33
164-173	83-86	B	3.00
160-163	80-82	B-	2.67
154-159	77-79	C+	2.33
146-153	73-76	C	2.00
140-145	70-72	C-	1.67
134-139	67-69	D+	1.33
126-133	63-66	D	1.00
120-125	60-62	D-	0.67
< 120	< 60	E	0.00

For more detail on letter grades and related University of Florida policies, please see the Grades and Grading Policies at <http://gradcatalog.ufl.edu/content.php?catoid=6&navoid=1219#grades>.

MAKE-UP POLICY: Students are allowed to make up work only as the result of substantial illness or other unanticipated circumstances. In the event of such emergency, documentation will be required in conformance with University policy. Work missed for any other reason will earn a grade of zero.

UNIVERSITY OF FLORIDA POLICIES

UNIVERSITY POLICY ON ACCOMMODATION OF STUDENTS WITH DISABILITIES: Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

UNIVERSITY POLICY ON ACADEMIC MISCONDUCT: Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>. You are expected and required to comply with the University's academic honesty policy (University of Florida Rules 6C1-4.017 Student Affairs: Academic Honesty Guidelines, available at <http://regulations.ufl.edu/chapter4/4017.pdf>). Cheating, plagiarism, and other forms of academic dishonesty will not be tolerated. Note that misrepresentation of the truth for academic gain (e.g., misrepresenting your personal circumstances to get special consideration) constitutes cheating under the University of Florida Academic Honesty Guidelines

NETIQUETTE – Communication Courtesy: All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions, and chats. The first instance of clearly rude and/or inappropriate behavior will result in a warning. The second instance will result in a deduction of five percentage points from your overall grade. The third instance will result in a drop of a letter grade (A to B, A- to B-, and so on). <http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf>

ONLINE FACULTY COURSE EVALUATION PROCESS: Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Constructive feedback will be utilized to make improvements to the course for future iterations. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

GETTING HELP:

For issues with technical difficulties for E-learning in Canvas, please contact the UF Help Desk at:

- learning-support@ufl.edu
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

Any requests for make-ups due to technical issues must be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You must e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up/extension. Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.