IMPORTANT: This syllabus form should be submitted to OAA (gsbs_academic_affairs@uth.tmc.edu) a week before the start of each semester.

NOTE to STUDENTS: If you need any accommodations related to attending/enrolling in this course, please contact one of the Graduate School's 504 Coordinators, Cheryl Spitzenberger or Natalie Sirisaengtaksin. We ask that you notify GSBS in advance (preferably at least 3 days before the start of the semester) so we can make appropriate arrangements.

Term and Year: **Spring 2024** Course Number and Course Title: **GS14 1612: Biostatistics for Life Scientists** **Credit Hours: 2** Meeting Location: **GSBS Large Room** **Building/Room#: S3.8371** WebEx/Zoom Link: **N/A**	**Program Required Course: Yes** Approval Code: **No** **Audit Permitted: Yes** Classes Begin: **Jan 8, 2024** Classes End: **May 3, 2024** Final Exam Week: **Apr 29- May 3, 2024**

Class Meeting Schedule

Day	Time
Mondays and Wednesdays	**1:00-2:00 P.M.**

Course Director Name and Degree: **Yin Liu, PhD** Title: Associate Professor Department: Neurobiology and Anatomy Institution: UTH Email Address: Yin.Liu@uth.tmc.edu Contact Number: 713-500-5632 **NOTE:** Office hours are available by request. Please email me to arrange a time to meet. **Teaching Assistant**: **TBD** Name and Email Address	**Instructor/s** 1. **Yuri Dabaghian, PhD** Institution: UTHealth Email Address: Yuri.A.Dabaghian@uth.tmc.edu 2. **Robert Suchting, PhD** Institution: UTHealth Email Address: Robert.Suchting@uth.tmc.edu 3. **Yin Liu, PhD** Institution: UTHealth Email Address: Yin.Liu@uth.tmc.edu

Course Description:

This is an entry-to-intermediate level course of biostatistics aimed for life scientists. The course will introduce students to the basic concepts and statistical tests that are routinely encountered in analyzing scientific data in designed experiments, as opposed to the analysis of clinical or epidemiological type data. Emphasis is on intelligent usage rather than mathematical formality. Standard statistical tests will be learned, as well as how power analyses and sample size calculation are performed. In addition, advanced topics in life sciences, including clustering methods and linear modeling will be covered.

Textbook/Supplemental Reading Materials (if any)

- N/A

Course Objective/s:

Upon successful completion of this course, students will be familiar with common statistical tests in analyzing experimental datasets.

***Specific Learning Objectives*:**

1. Obtain an understanding of the basic concepts of probability.
2. Learn how to describe data in meaningful ways.
3. Understand how to properly test hypotheses.
4. Learn to perform and properly interpret the standard statistical tests.
5. Be familiar with essential R functions for data analysis and visualization.

Student Responsibilities and Expectations:

Students enrolled in this course will be expected to perform the following activities:

1. Participate in and contribute to course discussions during lecture and review sessions.
2. Perform exercises on R programming each week.
3. Finish homework assignments that are given every other week.
4. Prepare for and take two exams based on lecture and R exercises.
5. Prepare and complete a group-based project analyzing a real dataset chosen by the group.
6. Prepare and present the group project.

While students may work and discuss all course materials and assignments in groups, all writing assignments must be students' own work. Plagiarism and failure to properly cite scientific literature and other sources will not be tolerated and are grounds for dismissal from the course and further GSBS disciplinary action. Cheating or engaging in unethical behavior during examinations will be grounds for dismissal from the course without credit and further GSBS disciplinary action.
Grading System: Letter Grade (A-F)
Student Assessment and Grading Criteria : *(May include the following:)*

Percentage	**Description**
Homework (10 %)	Students will be assigned three homeworks.
Midterm Exams (40 %)	Two exams with equal weights will be given in the first half of the semester.
Final Exam (40 %)	Final exam will include a group-based project, presentation, peer review and project revision.
Participation and/or Attendance (10 %)	Attendence will be recorded in each lecture.

CLASS SCHEDULE

Date	**Duration (Hour(s) taught by lecturer)**	**Lecture Topic**	**Lecturer/s**
Jan 8 & 10	2	Introduction to Statistics and R Programming	Liu & Suchting
Jan 17	2	Hypothesis testing; Binomial Probabilities	Dabaghian
Jan 22 & 24	2	Chi-squared Test; Nonparametric Tests	Dabaghian
Jan 29 & 31	2	Central Tendency, Z-test, & t-test	Dabaghian
Feb 5 & 8	2	Test Review and Exam 1	All Lecturers/TA
Feb 12 & 14	2	Aanalysis of Variance	Liu
Feb 19 & 21	2	Confidence Intervals & Statistical Power	Liu

Feb 26 & 28	2	Unsupervised Learning: Clustering Analysis	Liu
Mar 4 & 6	2	MultiD Scaling, Principle Component Analysis	Liu
Mar 11 & 13	2	Test Review and Exam 2	Liu
Mar 18 & 20		Spring Break	
Mar 25 & 28	2	Generalized Linear Mixed Modeling	Suchting
April 1 & 3	2	Applied Bayesian Inference	Suchting
April 8 & 10	2	Applied Machine Learning	Suchting
April 15 & 17	2	Student Project Presentation	All Lecturers/TA
April 22 & 24	2	Project Peer Review and Revision	All Lecturers/TA

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