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: **Fall 2022** Course Number and Course Title: **GS04 1251 Practical Bioinformatics** Credit Hours: **1 hour** Meeting Location: **Online Classes** Building/Room#: **N/A** **WebEx/Zoom Link:** https://mdacc.zoom.us/j/7560090560?pwd=Wnl3TnFKbUdYQUZkaG9jREhQMXlhZz09 Meeting ID: **756 009 0560** Password: **12345**	Program Required Course: **No** Approval Code: **No** **(If yes,** the Course Director or the Course Designee will provide the approval code.) **Audit Permitted: No** Classes Begin: **October 7, 2022** Classes End: **November 3, 2022** Final Exam Week: **Nov. 4-11, 2022**

Class Meeting Schedule

Day	Time
Friday	**9:00 a.m. -12:00 noon**

Course Director Name and Degree: **Bin Liu, PhD** Title: **Associate Professor** Department: **Epigenetics and Mol. Carcinogenesis** Institution: **MDACC** Email Address: bliu1@mdanderson.org Contact Number: **714-563-7959** **Course Co-Director/s:** Name and Degree: **Richard Wood, PhD** Title: **Professor** Department: **Epigenetics and Mol. Carcinogenesis** Institution: **MDACC** Email Address: rwood@mdanderson.org Contact Number: **832-750-7234**	**Instructor/s** (Use additional page as needed) 1. **Bin Liu, PhD** Institution: MDACC Email Address: bliu1i@mdanderson.org 2. **Han Xu, PhD** Institution: MDACC Email Address: hxu4@mdanderson.org 3. **Nidhi Sanhi, PhD** Institution: MDACC Email Address: nsanhi@mdanderson.org 4. **Yue Lu, PhD** Institution: MDACC Email Address: ylu4@mdanderson.org

Course Description:

The purpose of this course is to facilitate student learning, at an early stage of their research careers, regarding the basis and implementation of bioinformatics techniques that are especially applicable to research in modern molecular biology. Topics covered in the courses are: 1) Gene Expression Analysis (RNA seq and related techniques); 2) Cancer Genomics (TCGA data access and analysis); 3) Chromatin Accessibility (ATAC-seq data analysis); 4) Epigenetics and functional analysis (ChIP-seq, Bisulfite-seq, CRISPR/Cas9 screens); 5) Proteomics (Genome-wide protein interactions) .

Textbook/Supplemental Reading Materials

- **N/A**

<u>Course Objective/s</u>:

The purpose of this course is to facilitate student learning, at an early stage of their research careers, regarding the basis and implementation of bioinformatics techniques that are especially applicable to research in modern molecular biology.

***Specific Learning Objectives*:**

1. Learn RNA-seq and related techniques.
2. Learn the TCGA data access and analysis.
3. Learn the ChIP-seq, Bisulfite-seq, CRISPR/Cas9 screens.
4. Learn the ATAC-seq data analysis.
5. Learn the Genome-wide protein interactions.

Student Responsibilities and Expectations:

Students enrolled in this course will be expected to perform the following activities each week:
1. Read one or two research articles for each class session.
2. Finish homework on time.
3. Take course quizzes based on course lectures/ readings.
4. Attend every class session and participate the discussion on the class

Students are expected to complete all assigned reading materials

The course schedule is posted on Canvas. It starts promptly at 9 AM, so students must log into Zoom 5-10 minutes early so that time is not lost in connecting.

Technical Preparation

Bring a high-resolution computer, enabled for Zoom.
As you know, a good stable internet connection is important. You can probably find locations at MD Anderson if your home speed and stability is inadequate.
If you use an iPad, interactive annotation with an Apple pencil or similar is useful, but not required or necessary. You can also use the annotation functions in Zoom.

Individual preparation for each course session

Watch canvas in advance of each class for short tutorials or videos that we ask you to read through in advance, or one or two papers from the literature

Grading. The course is pass/fail. We ask for class participation. A "pass" will be given if all five homework assignments are returned.

Homework. will be short and given at the end of each class session. It will consist of some data analysis that will take no more than 30-45 minutes to complete.

Grading System: Pass/Fail

Student Assessment and Grading Criteria : *(May include the following:)*

Percentage	Description
Homework (80 %)	**Finish homework on time.**
Quiz (10 %)	**Participate in the quiz in class.**
Participation and/or Attendance (10 %)	**Attend all class sessions.**

CLASS SCHEDULE – Fall 2022

Date	Duration (Hour(s) taught by lecturer)	Lecture Topic	Lecturer/s
Oct. 7	3	RNA-seq and related techniques	Dr. Bin Liu
Oct. 14	3	TCGA data access and analysis	Dr. Bin Liu
Oct. 21	3	ChIP-seq, Bisulfite-seq, CRISPR/Cas9 screens	Dr. Han Xu
Oct. 28	3	ATAC-seq data analysis	Dr. Yue Lu
Nov. 4	3	Genome-wide protein interactions	Dr. Nidhi Sanhi

BL/jal