BIEN3320 , Spring 23-24

Items of Course Outlines

1. Instructor (s) – Name and Contact Details

   Jiguang Wang, jgwang@ust.hk

2. Teaching Assistant (s) - Name and Contact Details

   Yuyan Ruan, yruanaf@connect.ust.hk

   Zhi Huang, zhuangdq@connect.ust.hk

   Jiabao Li, jligm@connect.ust.hk

   Zongchao Mo, zmoad@connect.ust.hk

   Jihong Tang, jihong.tang@connect.ust.hk

   Kewei Xiong, kxiongac@connect.ust.hk

3. Meeting Time and Venue – Lectures, Tutorials/ Laboratory

L1	Monday	9:00	10:20	Rm 4502
L1	Wednesday	9:00	10:20	Rm 4502
T1	Thursday	13:30	14:20	Rm 4502

4. Course Description - Credit Points, Pre-requisite, Exclusion, Brief Information/synopsis

   This course will introduce the basic concept of data science, various types of high-throughput biomedical data, as well as proof-of-concept examples on the application of data science technologies in biology and medicine. Specifically, it will include practical methods for sequencing data processing and analytics, principles in statistical analysis, network biology, and basic machine learning. Students will be evaluated based on Attendance, the mid-term exam, the group project, and the student presentation.

5. Intended Learning Outcomes

   (State what the student is expected to be able to do at the end of the course according to a given standard of performance)

   [1] Obtain a basic understanding of data science as a discipline;
   [2] Understand high-throughput biomedical data of various types;
   [3] Visualize, analyze and interpret biomedical data with sound statistical principles;
   [4] Apply and develop computational methods for biomedical data analytics.

6. Assessment Scheme

Assessment	Assessing Course ILOs
(Percentage + assessment tasks)	*(Respective course ILOs)*
10% Attendance	[1]
50% Homework	[1-3]

20% Group project   [1-4]

20% Presentation   [1-4]

7. Student Learning Resources - Lecture Notes, Readings

Lecture notes and supplementary reading materials will be made available on canvas.

8. Teaching and Learning Activities

Teaching Activities	Course ILOs
Lecture/Seminar/Small-class/Laboratory	[1-4]
Tutorial	[3-4]
Others, pls specify	/

Weekly scheduled activities: 4 hrs

9. Course Schedule

Keyword Syllabus:

- Introduction to data science and its applications in biology and medicine
- Data acquisition and preprocessing
- Exploratory data analysis for biology and medicine
- Statistical analysis for biology and medicine
- Machine learning techniques for biology and medicine
- Bioinformatics and genomics
- Medical image analysis
- Clinical data analysis
- Network biology
- Deep learning in biology and medicine
- Ethical considerations in data science
- Case studies and applications