

## Items of Course Outlines

### 1. Instructor (s) – Name and Contact Details

Jiguang Wang, [jgwang@ust.hk](mailto:jgwang@ust.hk)

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

Yuyan Ruan, [yruanaf@connect.ust.hk](mailto:yruanaf@connect.ust.hk)

Zhi Huang, [zhuangdq@connect.ust.hk](mailto:zhuangdq@connect.ust.hk)

Ruochen Ma, [rmaam@connect.ust.hk](mailto:rmaam@connect.ust.hk)

Jihong Tang, [jihong.tang@connect.ust.hk](mailto:jihong.tang@connect.ust.hk)

JUNG Minyoung, [mjungaa@connect.ust.hk](mailto:mjungaa@connect.ust.hk)

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

L1	Monday	12:00	13:20	Rm 4502
L1	Wednesday	12:00	13:20	Rm 4502
T1	Thursday	15:30	16:20	LTK

### 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 principles in network biology, statistical analysis, basic machine learning, and practical methods for sequencing data processing and analytics. 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  
*(Percentage + assessment tasks)*

10% Attendance

Assessing Course ILOs  
*(Respective course ILOs)*

[1]

50% Mid-term exam	[1-3]
20% Group project	[1-4]
20% Student 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

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

Weekly scheduled activities: 4 hrs

9. Course Schedule

- W1: Introduction (T1)
- W2: High-throughput biological data (T2)
- W3: Biological networks (T3)
- W4: Network analysis (T4)
- W5: Correlation analysis (T5)
- W6: Sequencing analysis (T6)
- W7: Differential expression analysis (T7)
- W8: Function enrichment analysis (T8)
- W9: Mid-term Exam
- W10: Machine learning (T9)
- W11: Machine learning (T10)
- W12: Precision cancer medicine (T11)
- W13-14: Student Presentatio