LIFS 3580: Bioinformatics
Spring 2023 Syllabus

Lectures: Wednesday 13:30-14:50 and Friday 13:30-14:50

Venue: Computer Barn A (Rm 4402)

1. Instructors:

Course coordinator: Prof. Danny Leung (DL)
Phone: 3469-2494; Email: dcyleung@ust.hk
Office: Room 5519 (L25/26), Division of Life Science

Prof. Tom Cheung (TC)
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Office: Room 5507 (L25/26), Division of Life Science

2. Course description:

Credit points: 3
Prerequisites: LIFS3140
Exclusions: Nil
Brief description:

This course offers a basic introduction into bioinformatics. Students will be presented with an overview of what bioinformatic analysis entails, its importance in life science research and some applications. There will be several hands-on aspects but will not require experience in computer programming. Students will hopefully have their interests peaked to further explore the field in other courses and projects.

The course materials are primarily delivered through interactive lectures. Students will be able to apply what they learn through a variety of hands-on exercises. Moreover, take-home assignments will task the students to explore topics in greater depth.

3. Course intended learning outcomes (CILOs):
  I.   Describe basic concepts and methods in bioinformatic analysis.
  II.   Understand how bioinformatics has led to advances in understanding basic biology and human disease.
  III.   Become familiar with a range of bioinformatic tools, which are used for an array of life sciences applications.
  IV.   Explore how bioinformatics are applied in new research
  V.   Evaluate, on a conceptual level, how bioinformatics impact understanding of basic biology.

4. Assessment Scheme:

Mid-term exam	40%
Final Exam	40%
Assignments	15%
Class participation	5%

5. Student learning resources:

Lecture notes and supplementary reading materials will be made available on canvas.ust.hk prior to each lecture.

6. Course Schedule:

Week	Date	Topic	Instructor
1	Feb 3	**Introduction to bioinformatics/Course overview**	DL
2	Feb 8 Feb 10	**Sequence alignment and searching 1** Tutorial: Alignment of unknown genetic sequences	DL
3	Feb 15 Feb 17	**Sequence alignment and searching 2** **Sequence alignment and searching 3**	DL
4	Feb 22 Feb 24	Tutorial: Identify unknown protein sequences **Human genetics and genetic disorders 1**	DL
5	Mar 1 Mar 3	**Human genetics and genetic disorders 2** Tutorial: Analyzing genetic variants in disease	DL
	Mar 6	*Assignment I given*	
6	Mar 8 Mar 10	**Epigenomics** Tutorial: Visualizing the epigenome	DL
7	Mar 15 Mar 17	**Review session** **Mid-term Exam**	DL
8	Mar 22 Mar 24	**Gene Expression Analysis (Array)** Tutorial: Microarray analysis	TC
9	Mar 29 Mar 31	**Next-Generation Sequencing (NGS)** Tutorial: NGS data processing and visualization	TC
10	Apr 12 Apr 14	**Motifs and Functional annotations** Tutorial: Motif identification and Functional annotations/enrichment of unknown sequences	TC
	Apr 17	*Assignment II given*	TC
11	Apr 19 Apr 21	**Proteomics (Introduction)** **Proteomics (Instrumentation)**	TC
12	Apr 26 Apr 28	**Proteomics (Spectral Analysis)** Tutorial: Protein Identification Analysis	TC
13	May 3 May 5	**Crash course in Python** **Tutorial: General software and tools in Life Sciences**	DL, TC
	TBA	**Final Exam**	TC