

Academic Year: 2020 - 2021
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Important Message

The information provided here is for reference and may be subject to change by the course coordinator(s) or the offering department(s) concerned.

Section A: Course Information

BIOC3605 - Sequence bioinformatics

Faculty Science Faculty

Department

Description

School of Biomedical Sciences

Course Coordinator

Name	Faculty/ Department	Email Address
Choi Wah Wong	School of Biomedical Sciences	bcwwong@hku.hk

Credit Value 6.00

Course Grade A+ to F

Semester Offered Second Semester

Prerequisite(s)/ Corequisite(s)/Impermissible Combination(s)

Pass in BIOC2600 or BIOL2220 or BBMS2003 or BBMS2007 or MEDE2301 or BMED2301

Approved Syllabus

This course will examine existing bioinformatics tools for DNA and protein sequence analysis. The underlying principles of these analysis programs and services will be presented. Students will learn how to retrieve, analyze, and compare protein and DNA sequences using bioinformatics tools available on the internet. A basic introduction to the principles and tools for the analysis of next generation sequencing data will also be presented.

Section B: Teaching/ Learning

Course Type Lecture-based course

Course Learning Outcomes

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Academic Plan Major in Biochemistry (4)

On completing the course, students will be able to	Alignment with Programme Learning Outcomes
1 [SN: 001] On successful completion of this course, students should be able to search and retrieve sequence data from biological databases.	[SN: 00001] By the end of this programme, students should be able to describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology. [SN: 00002] By the end of this programme, students should be able to apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown. [SN: 00003] By the end of this programme, students should be able to interpret and communicate scientific data and literature using appropriate scientific language. [SN: 00005] By the end of this programme, students should be able to recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society.
2 [SN: 002] On successful completion of this course, students should be able to search and retrieve sequence data from biological databases.	[SN: 00001] By the end of this programme, students should be able to describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology. [SN: 00002] By the end of this programme, students should be able to apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown. [SN: 00003] By the end of this programme, students should be able to interpret and communicate scientific data and literature using appropriate scientific language. [SN: 00005] By the end of this programme, students should be able to recognize the interconnections of biochemistry with other

		disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society.
		<p>[SN: 00001] By the end of this programme, students should be able to describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology.</p> <p>[SN: 00002] By the end of this programme, students should be able to apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown.</p> <p>[SN: 00003] By the end of this programme, students should be able to interpret and communicate scientific data and literature using appropriate scientific language.</p> <p>[SN: 00005] By the end of this programme, students should be able to recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society.</p>
3	[SN: 003] On successful completion of this course, students should be able to apply the techniques of sequence analysis in various biological context.	
		<p>[SN: 00001] By the end of this programme, students should be able to describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology.</p> <p>[SN: 00002] By the end of this programme, students should be able to apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown.</p> <p>[SN: 00003] By the end of this programme, students should be able to interpret and communicate scientific data and literature using appropriate scientific language.</p> <p>[SN: 00005] By the end of this programme, students should be able to recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society.</p>
4	[SN: 004] On successful completion of this course, students should be able to interpret results from sequence alignments, BLAST database searches, and phylogenetic trees construction.	
		<p>[SN: 00001] By the end of this programme, students should be able to describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology.</p> <p>[SN: 00002] By the end of this programme, students should be able to apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown.</p> <p>[SN: 00003] By the end of this programme, students should be able to interpret and communicate scientific data and literature using appropriate scientific language.</p> <p>[SN: 00005] By the end of this programme, students should be able to recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society.</p>
		<p>[SN: 00001] By the end of this programme, students should be able to describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology.</p> <p>[SN: 00002] By the end of this programme, students should be able to apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown.</p> <p>[SN: 00003] By the end of this programme, students should be able to interpret and communicate scientific data and literature using appropriate scientific language.</p> <p>[SN: 00005] By the end of this programme, students should be able to recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society.</p>
5	[SN: 005] On successful completion of this course, students should be able to carry out basic analysis of next generation sequencing data.	

Course Teaching and Learning Activities

Description	Approx. number of hours (for normative student)	% of total study load
Lectures- contact hours	36.00	24.32
Tutorials- contact hours	12.00	8.11
Reading / Self study	100.00	67.57
Total	148.00	100.00

Assessment Methods and Weighting

Assessment methods	Weighting in final course grade (%)
Assignments	30.00
Examination	70.00
Total	100.00
Coursework/Examination Ratio	30.00% / 70.00%

Assessment Methods and Assignment

Assessment Methods and Assignment	Alignment with Course Learning Outcomes
1 Assignments	[SN: 001] On successful completion of this course, students should be able to search and retrieve sequence data from biological databases.

	<p>[SN: 002] On successful completion of this course, students should be able to search and retrieve sequence data from biological databases.</p> <p>[SN: 003] On successful completion of this course, students should be able to apply the techniques of sequence analysis in various biological context.</p> <p>[SN: 004] On successful completion of this course, students should be able to interpret results from sequence alignments, BLAST database searches, and phylogenetic trees construction.</p> <p>[SN: 005] On successful completion of this course, students should be able to carry out basic analysis of next generation sequencing data.</p>
2 Examination	<p>[SN: 002] On successful completion of this course, students should be able to search and retrieve sequence data from biological databases.</p> <p>[SN: 003] On successful completion of this course, students should be able to apply the techniques of sequence analysis in various biological context.</p> <p>[SN: 004] On successful completion of this course, students should be able to interpret results from sequence alignments, BLAST database searches, and phylogenetic trees construction.</p>

Course Grade Descriptors [Browse course grade descriptors](#)

Course URL <http://webapp.science.hku.hk/sr4/servlet/enquiry>

Related Major/ Minor/ Professional Core

Description	Associated Credit Unit Statement
Major in Biochemistry (4)	Nil
Minor in Biochemistry (4)	Nil

Section C: Course Schedule

Course Schedule for this year 2020-21

Semester	Session	Start Date	End Date	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start Time	End Time	Venue	Teaching Staff
2020-21 Sem 2	2A-LEC (1654)	19/01/2021	02/03/2021	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12:30 PM	01:20 PM	CYPP2	Choi Wah Wong Joshua Wing Kei Ho
2020-21 Sem 2	2A-LEC (1654)	22/01/2021	05/02/2021	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12:30 PM	02:20 PM	CYPP2	Choi Wah Wong Joshua Wing Kei Ho
2020-21 Sem 2	2A-LEC (1654)	19/02/2021	05/03/2021	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12:30 PM	02:20 PM	CYPP2	Choi Wah Wong Joshua Wing Kei Ho
2020-21 Sem 2	2A-LEC (1654)	19/03/2021	26/03/2021	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12:30 PM	02:20 PM	CYPP2	Choi Wah Wong Joshua Wing Kei Ho
2020-21 Sem 2	2A-LEC (1654)	23/03/2021	30/03/2021	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12:30 PM	01:20 PM	CYPP2	Choi Wah Wong Joshua Wing Kei Ho
2020-21 Sem 2	2A-LEC (1654)	09/04/2021	30/04/2021	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12:30 PM	02:20 PM	CYPP2	Choi Wah Wong Joshua Wing Kei Ho
2020-21 Sem 2	2A-LEC (1654)	13/04/2021	27/04/2021	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12:30 PM	01:20 PM	CYPP2	Choi Wah Wong Joshua Wing Kei Ho

Note: Teaching staff information will be printed once they are finalised.

Section D: Additional Course Information

Note: Information about course content and reading materials listed below is extracted from Moodle at scheduled intervals. Please refer to Moodle for up-to-date information.

Course Content and Topics

This course will introduce and discuss the following topics:

DNA and protein sequence database, protein family databases; information searching and retrieval; Simple sequence analysis; sequence alignment; pair-wise alignment, multiple sequence alignment, substitution matrices; sequence database searching; algorithm and parameters; sequence patterns and motifs, and profiles; phylogenetic analysis; gene prediction; analysis of next generation sequencing data

Required/ Recommended Readings and Online Materials

Higgs, P.G. & Attwood, T.K., 2005. Bioinformatics and molecular evolution, Malden, MA ; Oxford: Blackwell.
 Mount, D.W., 2004. Bioinformatics : sequence and genome analysis 2nd ed., Cold Spring Harbor, N.Y.: Cold Spring Harbor Laboratory Press.

Course Effectiveness Profile

Academic Year	Academic Career	Enrollment #	Response #	Response Rate (%)	Mean Course Effectiveness	Course Coordinator's Comments
1 2019	UG	60	6	10	75.0	
2 2018	UG	63	34	54	73.4	
3 2017	UG	51	27	52	80.6	

Note: Course effectiveness ratings are provided by the Social Sciences Research Centre (SSRC). If the number of response is less than 6, "Mean Course Effectiveness" will be masked. For further details, please refer to [Operational Guide for Student Evaluation of Teaching & Learning](#).

Section E: University Information**Academic Misconduct and Plagiarism****Academic honesty**

The University highly values honesty in the academic work submitted by students, and adopts a policy of zero tolerance on cheating in examinations and plagiarism in any work submitted for assessment. Any student who commits such an academic offence is liable to be considered by the University's Disciplinary Committee for possible disciplinary action which can result in serious consequences - including expulsion from the University.

Plagiarism is copying the work of another person without proper acknowledgement. There are two parts in the definition: copying and the absence of proper acknowledgement. As a result, it gives an impression to an ordinary reader that the work is the original work of the author when in fact it was copied from some others' work. Copying does not necessarily only mean copying word for word. Closely paraphrasing or substantial copying with minor modifications (such as changing grammar, adding a few words or reversing active/passive voices) is still copying for this purpose. It does not matter what the nature of the source is: it may be a book, an article, lecture notes or simply an assignment of another student, or in electronic form such as a website, an audio-visual production or other non-textual material, to name but a few. It does not matter whether the source has been published or not. Plagiarism covers any form of work submitted for assessment, including theses, dissertations, take-home examinations, assignments, projects and other forms of coursework.

Students are strongly advised to read the booklets "What is Plagiarism?" (<http://www.hku.hk/plagiarism/>) and "Plagiarism and How to Avoid it" (<http://www4.caes.hku.hk/plagiarism/>) and to consult your teachers if you have any questions on the definition of plagiarism and how to avoid it. Students are also advised to familiarise themselves with issues in relation to copyright as publicized in the section on "Copyright and Plagiarism" in the Student Handbook (<http://www.handbook.hku.hk/ug/>). These guidelines cover lecture notes, course materials, photocopies, internet materials as well as dissertations.

Students should read these guidelines carefully and revisit them from time to time.

University Assessment Policy

Please refer to the [University Assessment Policy](#) available online.

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