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

BBMS3008 - Essential Proteomics

Faculty LKS Medical Faculty

Department

Description
School of Biomedical Sciences

Course Coordinator

Name	Faculty/ Department	Email Address
Masayo Kotaka	School of Biomedical Sciences	masayo@hku.hk

Credit Value 6.00

Course Grade A+ to F

Semester Offered Second Semester

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

Pass in any one of the following courses: BBMS2007 Essential Molecular Biology or BIOC2600 Basic Biochemistry or BIOL2220 Principles of Biochemistry or BIOL3401 Molecular Biology

Approved Syllabus

This course will introduce protein structure and contemporary proteomics relevant to biomedical sciences. Protein structure will include protein structure classification and identification, protein modelling, and structure determination by X-ray crystallography and cryo-EM. Proteomics will include protein mass spectrometry, isotope labelling, and protein-protein interaction techniques.

Course Objectives

"Essential Proteomics" aims to:
• Introduce contemporary proteomics and structural proteomics relevant to biomedical sciences.
• Develop student understanding and insight into proteomics techniques and biomedical application including mass spectrometry coupled to gel and shotgun methods, and structural proteomics techniques including X-ray crystallography, NMR and Cryo-EM, with particular focus on drug discovery.
• Promote deep learning of course material through interactive problem-based learning teaching with opportunities for feedback.
• Provide opportunity for students to work together to interact with the proteomics scientific literature and communicate with their peers and teachers.

Section B: Teaching/ Learning

Course Type Lecture course

Course Learning Outcomes

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Academic Plan Minor in Genetics and Genomics (4)

	On completing the course, students will be able to	Alignment with Programme Learning Outcomes
1	[SN: 001] 1. Demonstrate a solid knowledge of protein structure/function and contemporary proteomics techniques.	[SN: 00001] Students should be able to demonstrate solid knowledge of biomedical sciences. [SN: 00002] Students should be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions. [SN: 00003] Students should be able to apply the core knowledge and skills for the pursuit of biomedical sciences research. [SN: 00004] Students should be able to evaluate research literature. [SN: 00005] Students should be able to make rational hypotheses about ill-defined biomedical sciences problems based on the best available data and evidence. [SN: 00006] Students should be able to identify potential approaches or research that will lead to the advancement in biomedical sciences. [SN: 00008] Students should be able to understand broader concepts of molecular and health sciences and be able to relate these to scientific issues of cultural, regional and global significance.
2	[SN: 002] 2. Apply proteomics and protein structure/function research approaches to major unanswered questions in biomedical sciences.	[SN: 00001] Students should be able to demonstrate solid knowledge of biomedical sciences. [SN: 00002]

		Students should be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions. [SN: 00003] Students should be able to apply the core knowledge and skills for the pursuit of biomedical sciences research. [SN: 00004] Students should be able to evaluate research literature. [SN: 00005] Students should be able to make rational hypotheses about ill-defined biomedical sciences problems based on the best available data and evidence. [SN: 00006] Students should be able to identify potential approaches or research that will lead to the advancement in biomedical sciences. [SN: 00008] Students should be able to understand broader concepts of molecular and health sciences and be able to relate these to scientific issues of cultural, regional and global significance. [SN: 00011] Students should be able to appreciate the role of biomedical sciences in the improvement of human conditions.
3	[SN: 003] 3. Demonstrate the ability to interpret proteomics and protein structure/function data and critically evaluate the capabilities and limitations of particular experimental approaches in written assessments and through group discussions and visuals (e.g. concept maps).	[SN: 00001] Students should be able to demonstrate solid knowledge of biomedical sciences. [SN: 00002] Students should be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions. [SN: 00003] Students should be able to apply the core knowledge and skills for the pursuit of biomedical sciences research. [SN: 00004] Students should be able to evaluate research literature. [SN: 00005] Students should be able to make rational hypotheses about ill-defined biomedical sciences problems based on the best available data and evidence. [SN: 00006] Students should be able to identify potential approaches or research that will lead to the advancement in biomedical sciences. [SN: 00007] Students should be able to engage in relevant and realistic self-appraisal as biomedical scientists and realize one's own capabilities and limitations. [SN: 00008] Students should be able to understand broader concepts of molecular and health sciences and be able to relate these to scientific issues of cultural, regional and global significance. [SN: 00009] Students should be able to communicate and collaborate effectively with scientific peers and healthcare professionals orally and in writing. [SN: 00010] Students should be able to understand the importance of ethics and integrity of scientific research, and respect the roles and contributions of other members of the team and display capacity for team work. [SN: 00011] Students should be able to appreciate the role of biomedical sciences in the improvement of human conditions. [SN: 00012] Students should be able to participate in the generation, interpretation, application and dissemination of biomedical sciences knowledge which will improve the quality of healthcare.
4	[SN: 004] 4. Communicate complex proteomics and protein structure/function data to scientific peers as a manuscript to be submitted to a peer-reviewed journal to articulate the role of proteomics in addressing major healthcare questions.	[SN: 00001] Students should be able to demonstrate solid knowledge of biomedical sciences. [SN: 00002] Students should be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions. [SN: 00003] Students should be able to apply the core knowledge and skills for the pursuit of biomedical sciences research. [SN: 00004] Students should be able to evaluate research literature. [SN: 00005] Students should be able to make rational hypotheses about ill-defined biomedical sciences problems based on the best available data and evidence. [SN: 00006] Students should be able to identify potential approaches or

		research that will lead to the advancement in biomedical sciences. [SN: 00007] Students should be able to engage in relevant and realistic self-appraisal as biomedical scientists and realize one's own capabilities and limitations. [SN: 00008] Students should be able to understand broader concepts of molecular and health sciences and be able to relate these to scientific issues of cultural, regional and global significance. [SN: 00009] Students should be able to communicate and collaborate effectively with scientific peers and healthcare professionals orally and in writing. [SN: 00010] Students should be able to understand the importance of ethics and integrity of scientific research, and respect the roles and contributions of other members of the team and display capacity for team work. [SN: 00011] Students should be able to appreciate the role of biomedical sciences in the improvement of human conditions. [SN: 00012] Students should be able to participate in the generation, interpretation, application and dissemination of biomedical sciences knowledge which will improve the quality of healthcare.

Course Teaching and Learning Activities

Description	Aprrox. number of hours (for normative student)	% of total study load
Tutorials- contact hours	18.00	18.75
Lectures- contact hours	18.00	18.75
Assessment	30.00	31.25
Reading / Self study	30.00	31.25
Total	96.00	100.00

Assessment Methods and Weighting

Assessment methods	Weighting in final course grade (%)
Assignments	50.00
Examination	50.00
Total	100.00
Coursework/Examination Ratio	50.00% / 50.00%

Assessment Methods and Assignment

	Assessment Methods and Assignment	Alignment with Course Learning Outcomes
1	Assignments : Protein modelling/ in-lecture assessment/assignments, Problem-based learning workshop assessment, and Group Project	[SN: 001] 1. Demonstrate a solid knowledge of protein structure/function and contemporary proteomics techniques. [SN: 002] 2. Apply proteomics and protein structure/function research approaches to major unanswered questions in biomedical sciences. [SN: 003] 3. Demonstrate the ability to interpret proteomics and protein structure/function data and critically evaluate the capabilities and limitations of particular experimental approaches in written assessments and through group discussions and visuals (e.g. concept maps). [SN: 004] 4. Communicate complex proteomics and protein structure/function data to scientific peers as a manuscript to be submitted to a peer-reviewed journal to articulate the role of proteomics in addressing major healthcare questions.
2	Examination	[SN: 001] 1. Demonstrate a solid knowledge of protein structure/function and contemporary proteomics techniques. [SN: 002] 2. Apply proteomics and protein structure/function research approaches to major unanswered questions in biomedical sciences. [SN: 003] 3. Demonstrate the ability to interpret proteomics and protein structure/function data and critically evaluate the capabilities and limitations of particular experimental approaches in written assessments and through group discussions and visuals (e.g. concept maps).

Course Grade Descriptors Browse course grade descriptors

Course URL Nil

Related Major/ Minor/ Professional Core

Description	Associated Credit Unit Statement
Minor in Genetics and Genomics (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 (1206)	18/01/2021	08/02/2021	☑	☐	☐	☐	☐	☐	☐	09:30 AM	11:20 AM	Online	Chengmin Qian Julian Alexander Tanner Kong Hung Sze
2020-21 Sem 2	2A-LEC (1206)	21/01/2021	04/03/2021	☐	☐	☐	☑	☐	☐	☐	09:30 AM	10:20 AM	Online	Chengmin Qian Julian Alexander Tanner Kong Hung Sze
2020-21 Sem 2	2A-LEC (1206)	22/02/2021	01/03/2021	☑	☐	☐	☐	☐	☐	☐	09:30 AM	11:20 AM	Online	Chengmin Qian Julian Alexander Tanner Kong Hung Sze
2020-21 Sem 2	2A-LEC (1206)	15/03/2021	29/03/2021	☑	☐	☐	☐	☐	☐	☐	09:30 AM	11:20 AM	Online	Chengmin Qian Julian Alexander Tanner Kong Hung Sze
2020-21 Sem 2	2A-LEC (1206)	18/03/2021	29/04/2021	☐	☐	☐	☑	☐	☐	☐	09:30 AM	10:20 AM	Online	Chengmin Qian Julian Alexander Tanner Kong Hung Sze
2020-21 Sem 2	2A-LEC (1206)	12/04/2021	26/04/2021	☑	☐	☐	☐	☐	☐	☐	09:30 AM	11:20 AM	Online	Chengmin Qian Julian Alexander Tanner Kong Hung Sze

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

1. Introduction to basic protein structure: motifs and domains
2. Techniques for production, purification and characterization of proteins
3. Structures of enzymes, membrane proteins and fibrous proteins
4. Structure determination by X-ray crystallography
5. Structure determination by Cryo-EM
6. Analysis and visualization of structural data
7. Protein structure modelling
8. Protein microarray
9. Biophysical characterization of protein-protein interactions
10. Mass spectrometry
11. Proteomics – from gel-based to shotgun approaches
12. Proteomics – isotopic labelling and emerging approaches
13. Bioinformatic analyses of proteomic data

Required/ Recommended Readings and Online Materials

TBC

Additional Course Information

Communication-intensive Course Syllabus Statement

What communication knowledge and skills will students learn in this course?
In this course students will learn aspects of academic discussion and writing skills as they learn complex proteomics and protein structure/function data. They will communicate the role of proteomics in addressing major healthcare questions to scientific peers through group discussions and a manuscript to be submitted to a peer-reviewed journal. Specific knowledge and skills to be learnt will include: engagement and contribution to a group discussion, active listening, ability to clearly and concisely present ideas, and how to construct an academic scientific text for a scientific audience using appropriate organizational and language features.

How will students learn these?
Students will learn and practice these through problem-based learning workshops with student-led discussions, and blind peer review and teacher feedback of their manuscript.

What does a good communicator look like in this course?
At the end of the course, students will have developed the following qualities of an effective communicator: confidence, openness to diverse perspectives and ways of learning, ability to respond to constructive criticism from peers and the teacher, developing interpersonal skills to collaborate with others to achieve a common goal, collaboration with peers, providing constructive feedback to peers, following the conventions of a genre, and having personal and academic integrity.

Course Effectiveness Profile

	Academic Year	Academic Career	Enrollment #	Response #	Response Rate (%)	Mean Course Effectiveness	Course Coordinator's Comments
1	2018	UG	14	7	50	62.5	
2	2016	UG	8	7	87	78.6	
3	2015	UG	11	10	91	82.5	

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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