UNSW Course Outline

BIOC3111 Molecular Biology of Proteins - 2024

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General Course Information

Course Code : BIOC3111
Year : 2024
Term : Term 2
Teaching Period : T2
Is a multi-term course? : No
Faculty : Faculty of Science
Academic Unit : School of Biotechnology and Biomolecular Sciences
Delivery Mode : Multimodal
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

This course builds on the concepts of protein structure and function that were introduced in the two pre-requisite courses, BIOC2101 and BIOC2201, to provide a comprehensive introduction to modern protein science. The lecture series covers fundamental aspects of protein structure and

function, with an emphasis on the latest analytical tools and processes employed in protein characterisation. Other topics covered include protein-protein interactions, protein folding, and protein engineering, with a strong focus on proteomics, which is the large-scale study of proteins inside the cell. BIOC3111 is core to the Molecular and Cell Biology Major and a highly valuable elective in other related discipline areas such as biotechnology, bioinformatics, and biochemistry. BIOC3111 is designed to provide an authentic experience in the inquiry process underlying scientific research and discovery. In particular, the practical component is an extended 8-week project that engages students with the process of experimental design and provides extensive hands-on laboratory experience. The course also integrates focused training in scientific writing that is supported by thorough feedback on scientific report assignments.

Course Aims

The overall aim of the course is to provide a solid foundation from which students can pursue future protein work in industry or academia (including Honours projects that involve characterising proteins). Weekly practical sessions provide exposure to procedures used in the routine purification and analysis of proteins, with particular attention to the planning and execution of purification and characterisation protocols. The course also aims to create learning environments that promote student engagement and motivation and facilitate the application of learning to real-life problems in scenarios where students work both independently and as a member of a team.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Explain the main research areas of modern protein science and their relevance to biology.
CLO2 : Explain the fundamental concepts of modern techniques in protein analysis.
CLO3 : Competently perform laboratory techniques in protein purification and analysis.
CLO4 : Communicate experimental results in the form of written scientific reports.
CLO5 : Identify and critically evaluate relevant scientific literature.
CLO6 : Design scientific experiments, troubleshoot arising problems, and interpret experimental data.

Course Learning Outcomes	Assessment Item
CLO1 : Explain the main research areas of modern protein science and their relevance to biology.	• Laboratory Reports • Final Examination • Early Bird Test
CLO2 : Explain the fundamental concepts of modern techniques in protein analysis.	• Laboratory Reports • Final Examination • Early Bird Test
CLO3 : Competently perform laboratory techniques in protein purification and analysis.	• Individual Short Report 1 • Laboratory Reports
CLO4 : Communicate experimental results in the form of written scientific reports.	• Individual Short Report 1 • Laboratory Reports
CLO5 : Identify and critically evaluate relevant scientific literature.	• Individual Short Report 1 • Laboratory Reports
CLO6 : Design scientific experiments, troubleshoot arising problems, and interpret experimental data.	• Individual Short Report 1 • Laboratory Reports

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Laboratory Reports Assessment Format: Individual	35%	
Individual Short Report 1 Assessment Format: Individual	20%	
Final Examination Assessment Format: Individual	30%	
Early Bird Test Assessment Format: Individual	15%	

Assessment Details

Laboratory Reports

Assessment Overview

This assessment consists of three parts: Laboratory Book (5%), Revision Quizzes (5%), and Individual Short Report 2 (25%).

Laboratory Notebook:

For the Laboratory Notebook (5%), you will be asked to record experiments during each laboratory session. They will be checked by your demonstrator and ongoing feedback will be provided during class throughout the term. Your completed laboratory notebook will be submitted to your demonstrator in the final practical class in Week 10 where they will conduct a final check of your notebook and award a mark during the class.

Revision Quizzes:

You will have access to 5 online revision activities worth 1% each for their successful completion. The revision activities cover material presented in lectures which includes important concepts underpinning the laboratory component of the course. The online revision activities can be completed as many times as you like and at any time during the course up until the final exam. Marks and dynamic feedback are provided immediately upon completion of each activity.

Individual Short Report 2:

By the end of Week 10, you are expected to submit a 5-page written scientific report on the experimental work you have conducted in the laboratory component of the course since your last report (Individual Short Report 1) was submitted. Detailed instructions on all report requirements

will be provided. Your report mark and individual written feedback will be provided within 2 weeks after the report submission deadline.

Course Learning Outcomes

- CLO1 : Explain the main research areas of modern protein science and their relevance to biology.
- CLO2 : Explain the fundamental concepts of modern techniques in protein analysis.
- CLO3 : Competently perform laboratory techniques in protein purification and analysis.
- CLO4 : Communicate experimental results in the form of written scientific reports.
- CLO5 : Identify and critically evaluate relevant scientific literature.
- CLO6 : Design scientific experiments, troubleshoot arising problems, and interpret experimental data.

Assignment submission Turnitin type

This is not a Turnitin assignment

Individual Short Report 1

Assessment Overview

In Week 7, you are expected to submit a 5-page written scientific report on the experimental work you have conducted to date in the laboratory component of the course. Detailed instructions on all report requirements will be provided. Your report mark and individual written feedback on strengths and weaknesses of your assessment will be provided within 2 weeks after the report submission deadline.

Course Learning Outcomes

- CLO3 : Competently perform laboratory techniques in protein purification and analysis.
- CLO4 : Communicate experimental results in the form of written scientific reports.
- CLO5 : Identify and critically evaluate relevant scientific literature.
- CLO6 : Design scientific experiments, troubleshoot arising problems, and interpret experimental data.

Final Examination

Assessment Overview

In the BIOC3111 final examination, you will be tested on theoretical material delivered throughout the term. The examination is 2 hours in duration and conducted in the formal final examination period. The questions are typically essay style or short response format and are marked by each relevant lecturer.

Feedback is available through inquiry with the course convenor.

Course Learning Outcomes

- CLO1 : Explain the main research areas of modern protein science and their relevance to biology.
- CLO2 : Explain the fundamental concepts of modern techniques in protein analysis.

Early Bird Test

Assessment Overview

In the Early Bird Test, you will be assessed on material presented in the lectures in the first three weeks of the term. The test is conducted in Week 4, is one hour in duration and typically consists of automatically marked question types such as multiple choice. Individual marks are provided within one week after the test date, along with general feedback to the cohort on overall areas of strength and weakness in test performance.

Course Learning Outcomes

- CLO1 : Explain the main research areas of modern protein science and their relevance to biology.
- CLO2 : Explain the fundamental concepts of modern techniques in protein analysis.

General Assessment Information

Grading Basis

Standard

Requirements to pass course

50% overall mark is required to pass this course. There are no hurdle tasks for this course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 27 May - 2 June	Lecture	Monday 27th May, 2-3pm Marc Wilkins/Ryan Salinas Course introduction. Sequences and protein evolution I
	Laboratory	Tuesday 2-6pm Introduction and protein assays
	Lecture	Wednesday 29th May, 9-10am Marc Wilkins Sequences and protein evolution II
	Lecture	Friday 31st May, 11am-12pm Marc Wilkins Post translational modifications I
Week 2 : 3 June - 9 June	Lecture	Monday 3rd June, 2-3pm Marc Wilkins Post translational modifications II
	Laboratory	Tuesday 2-6pm Protein purification I
	Lecture	Wednesday 5th June, 9-10am Sara Bollouz Protein bioinformatics I
	Lecture	Friday 7th of June, 11am-12pm Sara Bollouz Protein bioinformatics II
Week 3 : 10 June - 16 June	Lecture	NO LECTURE ON MONDAY DUE TO KING'S BIRTHDAY PUBLIC HOLIDAY
	Laboratory	Tuesday 2-6pm Protein purification II
	Lecture	Wednesday 12th June, 9-10am Marc Wilkins Proteomics I
	Lecture	Friday 14th June, 11am-12pm Marc Wilkins Proteomics II
Week 4 : 17 June - 23 June	Lecture	Monday 17th June, 2-3pm Kate Michie Report Writing Workshop
	Laboratory	Tuesday 2-6pm Early Bird Quiz to take place at the start of this practical session Protein purification III
	Lecture	Wednesday 19th June, 2-3pm Till Böcking Protein engineering I
	Lecture	Friday 21st June, 9-10am Till Böcking Protein engineering II
Week 5 : 24 June - 30 June	Lecture	Monday 24th June, 9-10am Marc Wilkins Protein-protein interactions I
	Laboratory	Tuesday 2-6pm Enzyme Assays
	Lecture	Wednesday 26th June, 11am-12pm Marc Wilkins Protein-protein interactions II
	Lecture	Friday 28th June, 11am-12pm Fatemeh Vafaee Systems Biology
Week 6 : 1 July - 7 July	Activity	Flexi Week - No lectures or labs this week
Week 7 : 8 July - 14 July	Lecture	Monday 8th July, 2-3pm Joshua Hamey Mass spectrometry I
	Laboratory	Tuesday 2-6pm Mass spectrometry
	Lecture	Wednesday 10th July, 9-10am Joshua Hamey Mass spectrometry II
	Lecture	Friday 12th July, 11am-12pm Paul Curmi Protein folding and stability
Week 8 : 15 July - 21 July	Lecture	Monday 15th July, 2-3pm Paul Curmi Protein folding and amyloid diseases
	Laboratory	Tuesday 2-6pm Protein crosslinking and mass spectrometry
	Lecture	Wednesday 17th July, 9-10am Paul Curmi Molecular motors and machines
	Lecture	Friday 19th July, 11am-12pm Paul Curmi Molecular chaperones
Week 9 : 22 July - 28 July	Lecture	Monday 22nd July, 2-3pm Paul Curmi Structure analysis by Cryo-EM
	Laboratory	Tuesday 2-6pm Mass spectrometry data analysis, structural analysis
	Lecture	Wednesday 24th July, 9-10am Joshua Hamey & Kate Michie Final Report Discussion
	Lecture	Friday 26th July, 11am-12pm Anthony Duff Complementary methods in structural biology
Week 10 : 29 July - 4 August	Lecture	Monday 29th July, 2-3pm Marc Wilkins The human proteome project
	Laboratory	Tuesday 2-6pm Work with demonstrators on final report. Lab book due for prac
	Lecture	Wednesday 31st July, 9-10am Marc Wilkins Clinical proteomics

	Lecture	Friday 2nd August, 11am-12pm Kate Michie & Ryan Salinas Revision and study guide

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

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Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Administrator	Ryan Salinas					Yes	Yes
Facilitator	Kate Michie					No	No
Head demonstrator	Joshua Hamey					No	No
Lecturer	Marc Wilkins					No	No
	Sara Ballouz					No	No
	Till Boecking					No	No
	Paul Curmi					No	No

Other Useful Information

Academic Information

Upon your enrolment at UNSW, you share responsibility with us for maintaining a safe, harmonious and tolerant University environment.

You are required to:

- Comply with the University's conditions of enrolment.
- Act responsibly, ethically, safely and with integrity.
- Observe standards of equity and respect in dealing with every member of the UNSW community.
- Engage in lawful behaviour.
- Use and care for University resources in a responsible and appropriate manner.
- Maintain the University's reputation and good standing.

For more information, visit the UNSW Student Code of Conduct Website.

Academic Honesty and Plagarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.
Further information about referencing styles can be located at https://student.unsw.edu.au/referencing

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage. At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.
Further information about academic integrity, plagiarism and the use of AI in assessments can be located at:

- The Current Students site,
- The ELISE training site, and
- The Use of AI for assessments site.

The Student Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct

Submission of Assessment Tasks

Penalty for Late Submissions
UNSW has a standard late submission penalty of:

- 5% per day,
- for all assessments where a penalty applies,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Any variations to the above will be explicitly stated in the Course Outline for a given course or assessment task.

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

Special Consideration

If circumstances prevent you from attending/completing an assessment task, you must officially apply for special consideration, usually within 3 days of the sitting date/due date. You can apply by logging onto myUNSW and following the link in the My Student Profile Tab. Medical documentation or other documentation explaining your absence must be submitted with your application. Once your application has been assessed, you will be contacted via your student email address to be advised of the official outcome and any actions that need to be taken from there. For more information about special consideration, please visit: https://student.unsw.edu.au/special-consideration

Important note: UNSW has a "fit to sit/submit" rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration. This is to ensure that if you feel unwell or are faced with significant circumstances beyond your control that affect your ability to study, you do not sit an examination or submit an assessment that does not reflect your best performance. Instead, you should apply for Special Consideration as soon as you realise you are not well enough or are otherwise unable to sit or submit an assessment.

Faculty-specific Information

Additional support for students

- The Current Students Gateway
- Student Support
- Academic Skills and Support
- Student Wellbeing, Health and Safety
- Equitable Learning Services
- UNSW IT Service Centre
- Science EDI Student Initiatives, Offerings and Guidelines