UNSW Course Outline

BIOM9332 Biocompatibility - 2024

Published on the 12 May 2024

General Course Information

Course Code : BIOM9332
Year : 2024
Term : Term 2
Teaching Period : T2
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : Graduate School of Biomedical Engineering
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate, Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Biocompatibility involves understanding how materials and medical devices interact with living tissues and biological systems without causing harm. In this course, you will delve into the world of medical devices, biomaterials, and tissue engineering, gaining insights into designing biocompatible medical devices.

Through a combination of lectures, activities, and independent tasks, you will explore biomaterials, predicting their reactions in biological systems. You will understand tissue engineering principles and apply them to innovate medical device design. We'll delve into how material processing, sterilisation, and handling impact medical device functionality, and examine host responses to biomaterials, predicting reactions to novel device designs. Finally, you will learn to propose testing regimes for new medical devices.

The course will challenge you with practical case studies, encouraging problem-solving and innovation in the biocompatibility field. By the end, you will be equipped with essential knowledge, practical skills, and a lifelong interest in contributing to the dynamic field of biomedical engineering.

Course Aims

This course equips students with the essential concepts of biocompatibility while guiding them in applying this knowledge to construct preclinical evaluation programs of medical devices. This ensures that students not only grasp theoretical foundations but also gain practical skills crucial for navigating the intricate landscape of biomedical engineering. The aims of the course are to:

1. Apply concepts that underpin biological performance of medical devices.
2. Develop preclinical evaluation programs for medical materials and devices, in particular tissue-engineered devices that incorporate biological materials and cultured cells.

Relationship to Other Courses

This course is part of the Materials & Cell Technologies theme within the Graduate School of Biomedical Engineering. It aligns with **BIOM9333 Cellular and Tissue Engineering** and has connections to **BIOM9561 Mechanical Properties of Biomaterials**. Complementary courses include **BIOM9410 Regulatory Requirements for Biomedical Technology.**

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Describe biomaterial classes, their general properties, and predict how specific materials may be affected by physiological conditions
CLO2 : Explain the principles of tissue engineering and apply these to novel medical device designs
CLO3 : Explain how material processing, sterilisation and handling may affect medical device function
CLO4 : Describe host responses to biomaterials and predict host responses to novel medical device designs
CLO5 : Describe biocompatibility and pre-clinical biological performance testing regimes, and propose a testing regime for a novel medical device

Course Learning Outcomes	Assessment Item
CLO1 : Describe biomaterial classes, their general properties, and predict how specific materials may be affected by physiological conditions	• Knowledge Checks • Final Exam • Major Project
CLO2 : Explain the principles of tissue engineering and apply these to novel medical device designs	• Knowledge Checks • Final Exam • Major Project
CLO3 : Explain how material processing, sterilisation and handling may affect medical device function	• Knowledge Checks • Final Exam • Major Project
CLO4 : Describe host responses to biomaterials and predict host responses to novel medical device designs	• Knowledge Checks • Final Exam • Major Project
CLO5 : Describe biocompatibility and pre-clinical biological performance testing regimes, and propose a testing regime for a novel medical device	• Knowledge Checks • Final Exam • Major Project

Learning and Teaching Technologies

Moodle - Learning Management System | Zoom | Echo 360

Additional Course Information

This course outlines the concepts of biocompatibility with emphasis on understanding biological responses to a range of biomaterials and medical devices. The course consists of 4h of face-to-face time per week, including lectures and workshops. Workshop (2h/week) attendance in-person is expected. Additional independent learning is expected based on guidelines provided

throughout the term, including reading of course materials, additional recommended tasks, and completion of assessment tasks.

This course compliments other BIOM courses including Cellular and Tissue Engineering, Mechanical Properties of Biomaterials, Regulatory Requirements for Biomedical Technology, Clinical Laboratory Science and certain thesis topics.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Knowledge Checks Assessment Format: Individual	20%	
Final Exam Assessment Format: Individual	40%	
Major Project Assessment Format: Group	40%	

Assessment Details

Knowledge Checks

Assessment Overview

A series of short quizzes designed to ensure learning throughout the term. Questions could take the form of multiple choice, true false and short answer.

Course Learning Outcomes

- CLO1 : Describe biomaterial classes, their general properties, and predict how specific materials may be affected by physiological conditions
- CLO2 : Explain the principles of tissue engineering and apply these to novel medical device designs
- CLO3 : Explain how material processing, sterilisation and handling may affect medical device function
- CLO4 : Describe host responses to biomaterials and predict host responses to novel medical device designs
- CLO5 : Describe biocompatibility and pre-clinical biological performance testing regimes, and propose a testing regime for a novel medical device

Assignment submission Turnitin type

This is not a Turnitin assignment

Final Exam

Assessment Overview

An exam designed to test the learning outcomes of the course. The exam will be administered online, and question-types could include multiple-choice, true/false, and short answer. The entire course will be assessed.

Course Learning Outcomes

- CLO1 : Describe biomaterial classes, their general properties, and predict how specific materials may be affected by physiological conditions
- CLO2 : Explain the principles of tissue engineering and apply these to novel medical device designs
- CLO3 : Explain how material processing, sterilisation and handling may affect medical device function
- CLO4 : Describe host responses to biomaterials and predict host responses to novel medical device designs
- CLO5 : Describe biocompatibility and pre-clinical biological performance testing regimes, and propose a testing regime for a novel medical device

Major Project

Assessment Overview

The Major Project is a a conceptual design project consisting of individual (10% or more) and group (30% or less) tasks designed to develop a critical appreciation of the principles of biocompatibility and their practical applications and develop innovation, problem-solving and collaboration skills.

The Major Project will comprise several submissions, and may include assessment types such as a written technical report, oral presentation, poster presentation and/or panel discussion.

Rubrics will be provided for each submission.

Course Learning Outcomes

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- CLO2 : Explain the principles of tissue engineering and apply these to novel medical device designs
- CLO3 : Explain how material processing, sterilisation and handling may affect medical device function
- CLO4 : Describe host responses to biomaterials and predict host responses to novel medical device designs
- CLO5 : Describe biocompatibility and pre-clinical biological performance testing regimes, and

propose a testing regime for a novel medical device

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

General Assessment Information

Grading Basis

Standard

Course Schedule

Attendance Requirements

Students are required to attend their timetabled workshops. Inability to attend the weekly workshop should be discussed with the course convenor.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Jelena Rnjak-Kovacina		Samuels 507	9385 3920		No	Yes
	Nona Farbehi					No	No

Other Useful Information

Academic Information

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that 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 enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Equitable Learning Services

III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/ Moodle/LMS applies.

Academic Honesty and Plagarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit:

student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,

- Pass/Fail assessment tasks.

Faculty-specific Information

Engineering Student Support Services – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

School Contact Information

Student Services can be contacted via unsw.to/webforms.