



Module Definition Form (MDF)

Module code: MOD009727	Version: 1 Date Amended: 27/Feb/2024
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1. Module Title
Tissue Engineering

2a. Module Leader
Adil Mustafa

2b. School
School of Engineering and the Built Environment

2c. Faculty
Faculty of Science and Engineering

3a. Level
6

3b. Module Type
Standard (fine graded)

4a. Credits
15

4b. Study Hours
150

5. Restrictions			
Type	Module Code	Module Name	Condition
Pre-requisite:	MOD009724	Biomaterials	Compulsory
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:			

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

Tissue Engineering is a fast-growing field in Biomedical Engineering with the aim to repair, regenerate and improve the functionality of a damaged tissue or whole organ through the utilisation of a functional construct/scaffold and with the aid of stem cell technology. In this module, you will learn about the fundamental aspects of tissue engineering with emphasis on both soft and hard tissue regeneration. The tissue engineering application in various medical fields including vascular, cardiac, skin, bone, and nervous system will be explored. The use of stem cell technology in assisting repair and regeneration will also be covered. You'll have the opportunity to listen to guest lecturers, visiting from Tissue engineering related company to discuss their work, and through this you will gain a better understanding of how the theoretical concepts can be applied to create structures that can assist with the treatment or improvement of tissue functionality.

6b. Outline Content

- Introduction to tissue engineering

- Materials synthesis and scaffold fabrication techniques for tissue engineering.

- Property requirements of scaffold materials for regenerative biological applications.

- Hydrogels and their utilisations in tissue engineering

- Stem cell science and technology

- The role of cellular responses to the local environment in tissue engineering.

- Surface chemistry and protein adsorption relevant to tissue engineering.

- Bioreactors

- Applications of tissue engineering: bone, skin, heart, vascular, and nervous system

6c. Key Texts/Literature

The reading list to support this module is available at: <https://readinglists.aru.ac.uk/>

6d. Specialist Learning Resources

Bioprinter

Electrospinning

Tensile machine

Computers and access to scientific journals

7. Learning Outcomes (threshold standards)

No.	Type	On successful completion of this module the student will be expected to be able to:
1	Knowledge and Understanding	Explain the tissue engineering concept and how it is applied in medical applications.
2	Knowledge and Understanding	Describe the key components in tissue engineering including scaffold types and fabrication techniques.
3	Knowledge and Understanding	Explain how stem cell can be applied in tissue engineering and its importance in repair and regeneration of diseased or damaged tissue.
4	Intellectual, practical, affective and transferrable skills	Apply skills in research, communication, information retrieval, and the effective use of general IT facilities.

8a. Module Occurrence to which this MDF Refers

Year	Occurrence	Period	Location	Mode of Delivery
2025/6	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence

Learning Activities	Hours	Learning Outcomes	Details of Duration, frequency and other comments
Lectures	18	1-2	Lectures 1.5 hrs x 12 weeks
Other teacher managed learning	18	3-4	1.5 hrs x 12 weeks- Workshops, seminars, or project work
Student managed learning	114	1-4	Students are expected to undertake self-directed study. These hours include time spent on assignments, reading sections from the recommended texts and self-managed learning.
TOTAL:	150		

9. Assessment for the above Module Occurrence

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	1-4	60 (%)	Fine Grade	30 (%)

Research and Lab report- 2000 words

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
011	Coursework	1-3	40 (%)	Fine Grade	30 (%)

1.5 hours in class test

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:

- (a) achieve the qualifying mark for each element of fine graded assessment as specified above
- (b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]