UCLouvain

lgbio2071

2020

Tissue Engineering

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits	30.0 h + 30.0 h	Q2

Teacher(s)	Kerckhofs Greet ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	The term 'tissue engineering' was officially coined at a National Science Foundation workshop in 1988 to mean 'the application of principles and methods of engineering and life sciences toward the fundamental understanding of structure-function relationships in normal and pathological tissues and the development of biological substitutes to restore, maintain or improve tissue function'. During this course, the following basic principles of Tissue Engineering will be addressed for regeneration of different tissues (skin, bone, cartilage, etc.) : * cell biology: stem cells, cell harvest, culture, extension and differentiation, ' * biomaterial science: general overview of the different classes of biomaterials, and their specific needs for tissue engineering purposes * bioprocessing technology: bioreactors and bioprocessing, design of biologically effective, yet scalable, devices. * in silico approaches: analytical and computational modeling for tissue engineering applications * preclinical screening and clinical application: animal models, ethical considerations, upscaling, ...
Aims	At the end of this course, students will be able to: a. Disciplinary Learning Outcomes • Understand the interdisciplinary nature of Tissue Engineering and the need for a close collaboration between engineers, biologists and clinicians. • Describe the basic principles of Tissue Engineering, and understand how they interact with each other. This provides the students with the knowledge and vocabulary necessary for communication with biomedical experts and clinicians. 1 • Evaluate and critically discuss scientific papers specifically related to Tissue Engineering. b. Transversal Learning Outcomes • Search and read a scientific paper with regards to a specific basic principle of tissue engineering, and critically evaluate its main results. • Make a poster of this paper, and present this to your peers by clearly stating the context and providing a critical opinion about the topic. - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** • Open book written examination • Projects with written reports and poster
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** • Theoretical lectures on the different aspects of tissue engineering (cells, biomaterials, bioreactors, monitoring and control, regulatory aspects, computational modelling, etc.) • Seminars by experts in the field and lab visit (if permitted) • Project work (in small groups) • Practical sessions in histology and imaging + learning how to work with an electronic labbook
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=12971
Bibliography	Tissue Engineering (second Edition), by Clemens van Blitterswijk and Jan De Boer.

Faculty or entity in charge	GBIO

Force majeure

Teaching methods	Lectures: online teaching TP sessions and project work: comodal (in presence when allowed, together with online teaching)
Evaluation methods	• Open book written examination • Projects with written reports and poster

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Biomedical Engineering	GBIO2M	5		