UCLouvain

Igbio2071

Tissue Engineering

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

5 credits	30.0 h + 30.0 h	Q2

English	Teacher(s)	Kerckhofs Greet;
Main themes The term 'itssue 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 issues and the development of biological substitutes to restore, maintain or improve issues function. During this course, the following basic principles of Tissue Engineering will be addressed for regeneration of different issues (sich, 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. *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 d	Language :	English
the application of principles and methods of engineering and life sciences toward the fundamental understanding of structure-function relationships in normal and pathological issues 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, carrillage, 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, Alt 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. * 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. * Alske 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 sh	Place of the course	Louvain-la-Neuve
different tissues (skin, bone, carliage, 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, 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. 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. Alake a poster of this paper, and present this to your peers by clearly stating the context and providing a critical principle of this 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 oftering this Teaching Unit." 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 oftering this Teaching Unit." Evaluation methods Due to the COVID-19 crisis, the information in this section is particularly likely to change. Theoretical lectures Seminars	Main themes	'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
* 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, 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. • 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. • 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. • Closed-book written examination • Projects with written reports and poster Due to the COVI		
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, 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. • Evaluate and critically discuss scientific papers specifically related to Tissue Engineering. • 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. • Closed-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 • Seminars by experts in the field and lab visit • Q&A sessions about the project Inline resources Moodle		* cell biology: stem cells, cell harvest, culture, extension and differentiation, '
* in silico approaches: analytical and computational modeling for tissue engineering applications * preclinical screening and clinical application: animal models, ethical considerations, upscaling, 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. * Evaluate and criticalls 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. **Closed-book written examination** **Projects with written reports and poster* **Due to the COVID-19 crisis, the information in this section is particularly likely to change. **Theoretical lectures* **Seminars by experts in the field and lab visit* **O&A sessions about the project* Inline resources **Moodle** **Moodle** **Faculty or entity in**		
* in silico approaches: analytical and computational modeling for tissue engineering applications * preclinical screening and clinical application: animal models, ethical considerations, upscaling, 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. * Evaluate and criticalls 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. **Closed-book written examination** **Projects with written reports and poster* **Due to the COVID-19 crisis, the information in this section is particularly likely to change. **Theoretical lectures* **Seminars by experts in the field and lab visit* **O&A sessions about the project* Inline resources **Moodle** **Moodle** **Faculty or entity in**		* bioprocessing technology: bioreactors and bioprocessing, design of biologically effective, yet scalable, devices.
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 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 Closed-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 - Seminars by experts in the field and lab visit - Q&A sessions about the project Inline resources Moodle Faculty or entity in GBIO		
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. • 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. • Closed-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 • Seminars by experts in the field and lab visit • Q&A sessions about the project Inline resources Moodle Faculty or entity in		
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. *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. *Closed-book written examination *Projects with written reports and poster Due to the COVID-19 crisis, the information in this section is particularly likely to change. *Theoretical lectures *Seminars by experts in the field and lab visit *Q&A sessions about the project Inline resources Moodle Faculty or entity in GBIO	Aims	At the end of this course, students will be able to:
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. 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. Closed-book written examination Projects with written reports and poster Due to the COVID-19 crisis, the information in this section is particularly likely to change. Theoretical lectures Seminars by experts in the field and lab visit Q&A sessions about the project Inline resources Moodle Faculty or entity in GBIO		·
This provides the students with the knowledge and vocabulary necessary for communication with biomedical experts and clinicians. • 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. • Closed-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 • Seminars by experts in the field and lab visit • Q&A sessions about the project Moodle Faculty or entity in GBIO		Understand the interdisciplinary nature of Tissue Engineering and the need for a close collaboration between engineers, biologists and clinicians.
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. Closed-book written examination Projects with written reports and poster Due to the COVID-19 crisis, the information in this section is particularly likely to change. Seminars by experts in the field and lab visit Q&A sessions about the project Inline resources Moodle GBIO		This provides the students with the knowledge and vocabulary necessary for communication with biomedical experts and clinicians.
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. • Closed-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 • Seminars by experts in the field and lab visit • Q&A sessions about the project Inline resources Moodle Faculty or entity in GBIO		b. Transversal Learning Outcomes
can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit". Due to the COVID-19 crisis, the information in this section is particularly likely to change. • Closed-book written examination • Projects with written reports and poster Due to the COVID-19 crisis, the information in this section is particularly likely to change. • Theoretical lectures • Seminars by experts in the field and lab visit • Q&A sessions about the project Inline resources Moodle Faculty or entity in GBIO		critically evaluate its main results. • Make a poster of this paper, and present this to your peers by clearly stating the context and providing
Closed-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 Seminars by experts in the field and lab visit Q&A sessions about the project Inline resources Moodle GBIO GBIO		
Projects with written reports and poster Due to the COVID-19 crisis, the information in this section is particularly likely to change. Theoretical lectures Seminars by experts in the field and lab visit Q&A sessions about the project Inline resources Moodle GBIO GBIO	Evaluation methods	Due to the COVID-19 crisis, the information in this section is particularly likely to change.
Theoretical lectures Seminars by experts in the field and lab visit Q&A sessions about the project Inline resources Moodle Faculty or entity in GBIO		
Seminars by experts in the field and lab visit Q&A sessions about the project Inline resources Moodle Faculty or entity in GBIO	Teaching methods	Due to the COVID-19 crisis, the information in this section is particularly likely to change.
Faculty or entity in GBIO		Seminars by experts in the field and lab visit
radily or entity in	Inline resources	Moodle
charge	Faculty or entity in	GBIO
	charge	

Programmes containing this learning unit (UE)							
Program title	Acronym	Credits	Prerequisite	Aims			
Master [120] in Biomedical Engineering	GBIO2M	5		Q			