

3.0 credits	30.0 h	2q
-------------	--------	----

Teacher(s) :	Agathos Spyridon ; Bastin Georges ; Lefèvre Philippe (coordinator) ; Legat Vincent ; Schneider Yves-Jacques ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	<p>The first part of the course focuses on an in-depth study of several selected topics, in order firstly to make students perceive the interest of the interaction between engineers and biologists, and secondly to prepare students to the specialized approach.</p> <ol style="list-style-type: none"> 1. Circulatory function: blood properties, cardiac pump function, hemodynamics and lymphatic flow, regulatory mechanisms of the circulatory function, physiopathological mechanisms. 2. Respiratory function: pulmonary gas exchanges, gas transport between lungs and tissues, regulation of the respiratory function, physiopathological mechanisms. 3. Major functions of the nervous system: acquisition, coding and sensorial information handling, motricity control circuits, sensorimotor co-ordination. 4. Introduction to physiological systems modeling in the entire body with applications, for example, in system analysis, fluid mechanics, signal processing and dynamics of articulated systems. <p>The second part of the course, which is mainly based on cellular biology and biochemistry, will provide in-depth study of a few topics and will show possible applications in the field of bioengineering. For example, but not limited to :</p> <ol style="list-style-type: none"> 1. Body's defense mechanisms. Application: biocompatibility. 2. Energetic metabolism. Application: modeling of cell culture bioreactor. 3. Enzyme kinetics. Application: enzymes in bioreactor.
Aims :	<p>GBIO 2221 is a course that focuses on system aspects on the one hand, and on cellular and biochemical aspects on the other hand. It emphasizes, thanks to numerous examples, the art of the engineer applied to the biomedical and biotechnological fields. It constitutes a first step towards specialized courses in biomedical engineering and bioengineering.</p> <p><i>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".</i></p>
Content :	<p>The first part of the course focuses on an in-depth study of several selected topics, in order firstly to make students perceive the interest of the interaction between engineers and biologists, and secondly to prepare students to the specialized approach.</p> <ol style="list-style-type: none"> 1. Circulatory function: blood properties, cardiac pump function, hemodynamics and lymphatic flow, regulatory mechanisms of the circulatory function, physiopathological mechanisms. 2. Respiratory function: pulmonary gas exchanges, gas transport between lungs and tissues, regulation of the respiratory function, physiopathological mechanisms. 3. Major functions of the nervous system: acquisition, coding and sensorial information handling, motricity control circuits, sensorimotor co-ordination. 4. Introduction to physiological systems modeling in the entire body with applications, for example, in system analysis, fluid mechanics, signal processing and dynamics of articulated systems. <p>The second part of the course, which is mainly based on cellular biology and biochemistry, will provide in-depth study of a few topics and will show possible applications in the field of bioengineering. For example, but not limited to :</p> <ol style="list-style-type: none"> 1. Body's defense mechanisms. Application: biocompatibility. 2. Energetic metabolism. Application: modeling of cell culture bioreactor. 3. Enzyme kinetics. Application: enzymes in bioreactor.
Other infos :	<p>FSAB1221 is a prerequisite for this course. The students must indeed have a basic knowledge in both "cellular" and "system" aspects of physiology.</p> <p>This course also constitutes a gate to engineers with regards to specialized teaching in biomedical engineering and bioengineering. Various introductory scientific books will be recommended in the framework of the course, and a copy of all slides used by the teachers will be provided to the students.</p> <p>Examination: a combination of a project, written and oral examination.</p>

<p>Cycle and year of study :</p>	<p>> Master [120] in Chemical and Materials Engineering > Master [120] in Statistics: Biostatistics</p>
<p>Faculty or entity in charge:</p>	<p>EPL</p>