

5.0 credits	30.0 h + 30.0 h	2q
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Teacher(s) :	Marchandise Emilie ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	<p>Main themes</p> <p>This course will cover several applications of biomechanics on living organisms. First of all, the course will approach simple fluid flow, blood circulation, and rheology of biological fluids. Cardiovascular physiology and blood rheology allow introducing the interest of mathematical modelling in the understanding of how complex organs such as the heart and artery network are working. This interdisciplinary approach aims at demonstrating that the mathematical study of many physiological aspects becomes a central issue for medical practice and cannot be obtained via a traditional description.</p> <p>The second part of the course will deal with the human ventilatory system (lung ventilation, respiratory function and modelling of the respiratory system).</p> <p>During the practical works, many clinical problems will be approached from the numerical and mathematical modelling point of view. Moreover, some sessions will be dedicated to practice (measure of physiological parameters, in-vitro measurements), while some others will be dedicated to the use of finite element calculation codes in order to solve local hemodynamic issues (stenoses, aneurysms, etc.)</p>
Aims :	<p>Aims</p> <ul style="list-style-type: none"> - to understand and to be able to model the great biomechanical systems. - to make a documented choice between different model types according to the application. - to be able to use computer tools in order to simulate numerically the developed biomechanical models <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>Content and teaching methods</p> <ul style="list-style-type: none"> - Fundamentals of fluid and solid biomechanics - The cardiovascular system - The lung system - Modelling of the different approached biomechanical systems <p>Method : theoretical course + practical work</p>
Other infos :	<p>Other information (prerequisite, evaluation, course materials recommended readings)</p> <p>This course concerns the students who are interested in carrying out research in the field of biomechanics, and those who intend to work in biomedical companies.</p> <p>Prerequisite :</p> <p>Basic knowledge of numerical methods and fluid/solid mechanics (e.g. MECA 2321 course or similar, course on mechanics of continuous media).</p> <p>Evaluation:</p> <p>Personal work, written exam</p> <p>Course materials:</p> <p>Syllabus (theoretical and practical work) and slides</p>
Cycle and year of study :	<p>> Master [120] in Mechanical Engineering</p> <p>> Master [120] in Mathematical Engineering</p> <p>> Master [120] in Computer Science and Engineering</p> <p>> Master [120] in Electrical Engineering</p> <p>> Master [120] in Electro-mechanical Engineering</p> <p>> Master [120] in Biomedical Engineering</p>

Faculty or entity in charge:	EPL
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