

5 credits	30.0 h + 30.0 h	Q1 and Q2
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Teacher(s)	Demoustier Sophie ;Lefèvre Philippe ;Ronsse Renaud ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	<p>This course aims at providing a large panel of the scientific and technological challenges in biomedical engineering, both for R&amp;D perspectives and for industrial value-creation perspectives. The course mainly covers the following themes: the IP management, the certification of medical devices and associated standards and norms, the financing of social security and health economy in the broad sense, the functioning and management of a hospital, the management of clinical trials, etc. These themes are further covered in the particular context of biomedical engineering.</p> <p>Moreover, this course includes an important project, whose objective is to exploit the above competences to study a biomedical technology, selected by the students in tandem with the teaching staff. In particular, the project will consist in studying the life cycle of this technology.</p>
Aims	<p>Regarding the learning outcomes of the programme of "Master in Biomedical Engineering", this course contributes to the development and the acquisition of the following skills :</p> <ul style="list-style-type: none"> <li>• AA1.1, AA1.2, AA1.3</li> <li>• AA2.1, AA2.2</li> <li>• AA3.1, AA3.2</li> <li>• AA4.3</li> <li>• AA5.2, AA5.3, AA5.4, AA5.5, AA5.6</li> <li>• AA6.1, AA6.2, AA6.3, AA6.4</li> </ul> <p>The course mainly targets the acquisition of scientific and industrial competences, and of engineering skills similar to those being exploited in a design office, in the field of biomedical engineering.</p> <p>a. <u>Disciplinary Learning Outcomes</u></p> <p><b>At the end of this course, students will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Understand and summarize a seminar presenting a specific feature of the clinical, economical and industrial environment in biomedical engineering.</li> <li>2. Explain the main challenges paving the way during the valorization process for a biomedical technology.</li> <li>3. Develop expertise regarding the different steps of the life cycle of a biomedical product, and summarize this in a technical report. For instance: commercialization decision, procurement of the CE label, product evolution within a company (product supply to the hospital, positioning with respect to the competitors, etc.), management of the reimbursement procedure by the social security system, etc.</li> </ol> <p>b. <u>Transversal Learning Outcomes</u></p> <p><b>At the end of this course, students will be able to:</b></p> <ol style="list-style-type: none"> <li>4. Write down a clear and concise summary of an industrial seminar.</li> <li>5. Conduct a project in a group, requiring:             <ol style="list-style-type: none"> <li>a. To rephrase some objectives.</li> <li>b. To separate the basis problem into sub-tasks.</li> <li>c. To evaluate the necessary resources for each task, and write down a working plan.</li> <li>d. To distribute the work to be done within the group.</li> <li>e. To maintain efficient communication within the group.</li> <li>f. To keep the industrial partner in the loop.</li> <li>g. To make collective decisions.</li> <li>h. To manage interpersonal relationships within the group, and to solve potential conflicts in a constructive way.</li> </ol> </li> <li>6. Perform a convincing public presentation.             <ol style="list-style-type: none"> <li>7. Apply the standards and norms in the biomedical domain.</li> </ol> </li> </ol> <p>-----</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>

<p>Evaluation methods</p>	<p>The evaluation is exclusively based on the group project studying the life cycle of a biomedical device. This project must include (open list) :</p> <ul style="list-style-type: none"> <li>- The process leading to the decision for commercialization,</li> <li>- The procurement of the CE labeling,</li> <li>- The product life within the producing company (storage, ordering, delivery to the hospital, etc.),</li> <li>- The product life within the hospital (potentially until the surgical room),</li> <li>- The positioning of the product with respect to concurrent solutions,</li> <li>- The management of the reimbursement process by the social security system, potentially including the procedure to make this reimbursement possible,</li> <li>- etc.</li> </ul> <p>Except exceptional situations, the evaluation takes the group performances into account and is identical across the group students. Individual students who would not have provided a fair personal contribution within their group will perform individual complementary work (to be determined) that will be evaluated within the exam session of September.</p> <p>Moreover, students must take part to the three 'Interuniversity Biomedical Engineering Days' and to the National Day on Biomedical Engineering to potentially get a Pass mark during the exam session of June.</p>
<p>Teaching methods</p>	<p><b>Process organisation</b></p> <p>Early in the year, students freely make groups of 3 to 4 students and select a topic within a list showcasing brief descriptions of biomedical technologies being currently developed in the industry.</p> <p>Thereafter, they realize the above-mentioned project.</p> <p>At the end of the year, a public presentation of the project is organized, potentially with industrial partners being involved in the valorization of similar products as attendees. Throughout the year, students are supported by a tutor they meet three to four times each semester.</p> <p><b>Supports</b></p> <p>Moreover, taking part to the following activities is mandatory in the framework of this course, in the sense that they provide the basic expertise being necessary to achieve the project:</p> <ul style="list-style-type: none"> <li>- The three "Interuniversity biomedical engineering days", jointly organized by ULB, UCL, and ULg: <a href="http://biomed-days.ulb.ac.be/agenda/">http://biomed-days.ulb.ac.be/agenda/</a></li> </ul> <p>The National Day on Biomedical Engineering: <a href="http://www.ncbme.ugent.be/">http://www.ncbme.ugent.be/</a></p>
<p>Content</p>	<ul style="list-style-type: none"> <li>• The three "Interuniversity biomedical engineering days"</li> <li>• The National Day on Biomedical Engineering</li> <li>• The industrial project with tutoring sessions</li> </ul>
<p>Inline resources</p>	<p><a href="http://moodleucl.uclouvain.be/course/view.php?id=7763">http://moodleucl.uclouvain.be/course/view.php?id=7763</a></p>
<p>Faculty or entity in charge</p>	<p>GBIO</p>

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