

4.0 credits	22.5 h + 15.0 h	1q
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Teacher(s) :	Félix Yves ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	Texts given during the lectures, list of exercises, questions of the previous exams (with aims and solutions)
Prerequisites :	Cours LMAT1121 Analyse mathématique 1, or equivalent lecture. Good knowledge of the French language.
Main themes :	Topological spaces, continuous maps, extension of continuous maps, notion of compactity, connexity and separation, degree of a self-map of the circle.
Aims :	<p>Contribution of the course to learning outcomes in the Bachelor in Mathematics programme. By the end of this activity, students will have made progress in:</p> <ul style="list-style-type: none"> <li>- Understand a basic domain of mathematics. They will be able to</li> <li>-- choose and use fundamental tools from topology to solve mathematical problems in algebra, analysis and geometry.</li> <li>-- Understand deeply the basic tools of the theory. They will understand their importance and be able to explain them with concrete examples.</li> <li>be able to</li> <li>-To develop in parallel a visual approach and a strict rigorous formalization</li> <li>- To develop abstraction and reflexion. In particular he will be able to</li> <li>-- Combine intuition, geometric vision and formalization.</li> <li>-- Put in evidence the key points and the structure of a proof.</li> <li>-- Build a proof for a theoretical exercise.</li> <li>-- Analyse the validity of a sequence of arguments.</li> </ul> <p>Learning outcomes specific to the course. By the end of this activity, students will be able to:</p> <ul style="list-style-type: none"> <li>- Use the basic tools of general topology in their important applications in commutative algebra, geometry and functional analysis.</li> <li>- Use the basic results of the theory (Tietze, Urysohn, Brouwer).</li> <li>- Use topology to describe geometric spaces or abstract structures.</li> <li>- Savoir utiliser les concepts de la topologie pour résoudre des problèmes précis.</li> </ul> <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>
Evaluation methods :	Assessment is based on a written examination with three parts of equal value: one part checking acquisition of the subject taught; one part requiring more thought to show that the student has been able to put the subject into perspective and has in part absorbed it; and a third part consisting of exercises in the same style as those performed throughout the year.
Teaching methods :	Learning activities consist of lectures and exercise sessions. The lectures aim to introduce fundamental concepts, to explain them by showing examples and by determining their results. Only results whose proofs are not hyper-technical are demonstrated in the course. Results are often presented with historical commentary and with applications. Exercise sessions aim at assimilating theory by means of calculation exercises and exercises in thinking. The teacher and exercise assistant have informed students of the office hours during which they are available for further explanation.
Content :	<p>The lectures will introduce to the basic tools to topology that are used in the other lectures of the bachelor or master in mathematical sciences. More precisely the following items will be considered:</p> <ul style="list-style-type: none"> <li>- Definition and example of a topological space</li> <li>- Continuous maps and homeomorphisms</li> <li>- Convergence and limit in metric spaces and in more general spaces</li> <li>- Extension of continuous maps and normal spaces</li> <li>- Compactity and local compactity</li> <li>- Connected and path connected spaces</li> <li>- Product of topological spaces</li> <li>- Quotient topology and construction of spaces by adjunction of cells</li> <li>- Degree of a self-map of the circle</li> </ul>

<p>Bibliography :</p>	<p>&amp; t;!--{cke_protected}{C}%3C!%2D%2D%0A%20%2F*%20Font%20Definitions%20*%2F%0A%40font-face%0A%09%7Bfont-family%3A%22Cambria%20Math%22%3B%0A%09panose-1%3A2%204%205%203%205%204%206%203%202%204%3B%0A%09mso-font-charset%3A0%3B%0A%09mso-generic-font-family%3Aauto%3B%0A%09mso-font-pitch%3Avariable%3B%0A%09mso-font-signature%3A3%200%200%200%201%200%3B%7D%0A%40font-face%0A%09%7Bfont-family%3A%22E3%83%92%E3%83%A9%E3%82%AE%E3%83%8E%E8%A7%92%E3%82%B4%20Pro%20W3%22%3B%0A%09mso-font-charset%3A0%3B%0A%09mso-generic-font-family%3Aroman%3B%0A%09mso-font-pitch%3Aauto%3B%0A%09mso-font-signature%3A0%200%200%200%200%3B%7D%0A%20%2F*%20Style%20Definitions%20*%2F%0A%09mso-normal%2C%20li.MsoNormal%2C%20div.MsoNormal%0A%09%7Bmso-style-unhide%3A%20%3B%0A%09mso-style-qformat%3Ayes%3B%0A%09mso-style-parent%3A%22%22%3B%0A%09margin%3A0cm%3B%0A%09margin-bottom%3A.0001pt%3B%0A%09mso-pagination%3Awidow-orphan%3B%0A%09font-size%3A12.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%0A%09mso-fareast-font-family%3A%22Times%20New%20Roman%22%3B%0A%09mso-bidi-font-family%3A%22Times%20New%20Roman%22%3B%0A%09mso-ansi-language%3AEN-US%3B%0A%09mso-fareast-language%3AEN-US%3B%7D%0A%09mso-style-unhide%3A%20%3B%0A%09mso-style-parent%3A%22%22%3B%0A%09margin%3A0cm%3B%0A%09margin-bottom%3A.0001pt%3B%0A%09mso-pagination%3Awidow-orphan%3B%0A%09font-size%3A12.0pt%3B%0A%09mso-bidi-font-size%3A10.0pt%3B%0A%09font-family%3AHelvetica%3B%0A%09mso-fareast-font-family%3A%22E3%83%92%E3%83%A9%E3%82%AE%E3%83%8E%E8%A7%92%E3%82%B4%20Pro%20W3%22%3B%0A%09mso-bidi-font-family%3A%22Times%20New%20Roman%22%3B%0A%09color%3Ablack%3B%0A%09mso-ansi-language%3Afr%3B%7D%0A.MsoChpDefault%0A%09%7Bmso-style-type%3Aexport-only%3B%0A%09mso-default-props%3Ayes%3B%0A%09font-size%3A10.0pt%3B%0A%09mso-ansi-font-size%3A10.0pt%3B%0A%09mso-bidi-font-size%3A10.0pt%3B%7D%0A%40page%20WordSection1%0A%09%7Bsize%3A612.0pt%20792.0pt%3B%0A%09margin%3A70.85pt%2070.85pt%2070.85pt%2070.85pt%3B%0A%09mso-header-margin%3A36.0pt%3B%0A%09mso-footer-margin%3A36.0pt%3B%0A%09mso-paper-source%3A0%3B%7D%0Adiv.WordSection1%0A%09%7Bpage%3AWordSection1%3B%7D%0A%2D%2D%3E--&amp; t;</p> <p>Notes given during the lectures</p>
<p>Cycle and year of study :</p>	<p><a href="#">&gt; Bachelor in Mathematics</a>  <a href="#">&gt; Bachelor in Economics and Management</a>  <a href="#">&gt; Bachelor in Engineering</a>  <a href="#">&gt; Bachelor in Physics</a></p>
<p>Faculty or entity in charge:</p>	<p>MATH</p>