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| 5.0 credits | 45.0 h | 2q |
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| Teacher(s) : | Gran Marino ; Vitale Enrico ; |
| Language : | Anglais |
| Place of the course | Louvain-la-Neuve |
| Inline resources: | <p>&lt;!--{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%200%3B%7D%0A%20%2F*%20Style%20Definitions%20*%2F%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-foreast-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-foreast-language%3AEN-US%3B%7D%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-foreast-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%09mso-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%0A%40div.WordSection1%0A%09%7Bpage%3AWordSection1%3B%7D%0A%2D%2D%3E--&gt;</p> <p>Website iCampus (> http://icampus.uclouvain.be/).</p> |

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| Evaluation methods : | Assessment is by oral examination. This tests knowledge and understanding of concepts, examples and fundamental results, ability to construct a coherent argument, and ability to master the techniques of proof introduced in the course. The examination is usually based on six questions, two of which are chosen by the student. Students may also choose the examination language (English or French). |
| Teaching methods : | The course is taught through lectures. During the sessions, students are asked to give suggestions and formulate ideas on the basis of their previous knowledge in order to further the course. Special attention is paid to the analysis of connections between the new concepts introduced in the course and the other courses in the Bachelor and Master in Mathematics. |
| Content : | <p>In this course we introduce the basic language and some fundamental results in category theory, in order to explain some mathematical situations encountered in other courses during the bachelor program and the first year of the master program in mathematics.</p> <p>The following subjects are studied:</p> <ul style="list-style-type: none"> - Definition and examples of categories, functors, natural transformations. - Isomorphisms, monomorphisms and epimorphisms in a category. - Adjoint functors (unit, counit, triangular identities) and their fundamental properties. Reflective subcategories and equivalences of categories. - Special limits and colimits. Existence and construction of limits and colimits. - Limits and adjoint functors. Freyd's adjoint functor theorem. - Definition of regular and of exact category, main properties and examples. Barr-Kock theorem. Mal'tsev categories. - Exact sequences, five lemma, nine lemma, snake lemma. |
| Bibliography : | <p>& mp; ;</p> <p>Lecture notes for exact, additive and abelian categories (available on the iCampus website).</p> <p>F. Borceux : Handbook of categorical algebra, Vol. 1-2 (Cambridge University Press).</p> <p>D. Bourn et M. Gran, Regular, Protomodular and Abelian Categories, (Cambridge University Press) (available on the iCampus website).</p> <p>P. Freyd : Abelian categories (available on the iCampus website).</p> <p>S. Mac Lane : Categories for the Working Mathematician (Springer).</p> |
| Faculty or entity in charge: | MATH |

| Programmes / formations proposant cette unité d'enseignement (UE) | | | | |
|--|-------------------------|---------|-----------|---|
| Intitulé du programme | Sigle | Credits | Prerequis | Acquis d'apprentissage |
| Master [120] in Mathematics | MATH2M | 5 | - |  |
| Master [60] in Mathematics | MATH2M1 | 5 | - |  |