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| <b>Course:</b><br>Advanced Applied Engineering Mathematics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        | <b>Teaching Language:</b><br>English |
| <b>SSD (Subject Areas):</b> MATH-04/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        | <b>CREDITS:</b> 9                    |
| <b>Course year:</b> I/II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Type of Educational Activity:</b> C |                                      |
| <b>Teaching Methods:</b> in-person                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |                                      |
| <b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b><br>Skills related to the study, from both a theoretical and applicative point of view, of Mathematical Physics, using both analytical and geometric techniques.                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                                      |
| <b>Objectives:</b><br>The aim of the course is to introduce the fundamental principles of mathematical modelling for formalizing and solving advanced engineering problems. The course will provide basic knowledge of computational methods (i.e. finite difference and finite element), for parabolic, hyperbolic and elliptic problems. The numerical discussion of each type of equation will be always preceded by the introduction/derivation of the models. Moreover, the role of initial and boundary conditions will be pointed out with reference to physical situations. The numerical investigation will concern the development of special applications on MATLAB platform. |                                        |                                      |
| <b>Propaedeuticities:</b> none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                                      |
| <b>Is a propaedeuticity for:</b> none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |                                      |
| <b>Types of examinations and other tests:</b><br>The exam is constituted by an oral test to verify student knowledge and the discussion of a project which can be developed in groups (2-4 people) and is related to the application of the studied methodologies to an engineering problem selected in agreement with the Instructor. The evaluation will be quantified as follows: 50% for the oral exam and 50% for the project quality and defence.                                                                                                                                                                                                                                  |                                        |                                      |