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| **Academic subject:** Riemannian Geometry | | | | |
| **Degree Class:**<br>LM-40 – Matematica | | **Degree Course:**<br>Mathematics | **Academic Year:**<br>2017/2018 | |
| | | **Kind of class:**<br>optional | **Year:** | **Period:**<br>II semester |
| | | | **ECTS:** 7<br>divided into<br>**ECTS lessons:** 6,5<br>**ECTS exe/lab/tutor:** 0,5 | |
| **Time management, hours, in–class study hours, out–of–class study hours**<br>lesson: 52 exe/lab/tutor: 8 in–class study: 60 out–of–class study: 115 | | | | |
| **Language:**<br>Italian | **Compulsory Attendance:**<br>no | | | |
| **Subject Teacher:**<br>Luigia Di Terlizzi<br>**Collaborator:** Dileo Giulia | **Tel:** 080 5442694<br>**e–mail:**<br>luigia.diterlizzi@uniba.it | **Office:**<br>Department of Mathematics<br>Room 19, Floor III | **Office days and hours:**<br>Wednesday 9.30 – 11.30;<br>other days by appointment. | |
| **Prerequisites:** Basic knowledge in differential geometry: differentiable manifolds, tangent and cotangent spaces, tangent bundle. Tensorial algebra and tensorial calculus. Elements of Riemannian geometry. | | | | |
| **Educational objectives:** Knowledge of the most important results in Riemannian geometry, with special attention to Hermitian and contact geometry. | | | | |
| **Expected learning outcomes (according to Dublin Descriptors)** | **Knowledge and understanding:**<br>Acquiring results in the mostly investigated research fields of Riemannian Geometry, allowing to comprehend advanced textbooks and recent publications.<br><br>**Applying knowledge and understanding:**<br>Acquiring proof techniques in Hermitian and contact geometry, together with the knowledge of fundamental examples.<br><br>**Making judgements:**<br>Ability to analyze the consistency of mathematical arguments, under the formal, logical and technical point of view. Students should become able to prove autonomously properties dealing with the program topics.<br><br>**Communication:**<br>Students should acquire the mathematical language and formalism necessary to the comprehension and exposition of concepts and results concerning the studied theory.<br><br>**Lifelong learning skills:**<br>Improve learning methods acquired during previous years, through the practice in exposing results and solving problems. | | | |
| **Course program**<br><br>G-structures on differentiable manifolds. Almost complex manifolds and complex manifolds. Hermitian and Kähler metrics. Holomorphic sectional curvature. Spaces of constant holomorphic sectional curvature. Ricci curvature and Kähler-Einstein metrics. Hermitian connections.<br><br>Contact forms on differentiable manifolds and the Reeb vector field. Contact manifolds: examples. Compatible metrics on an almost contact manifold. Almost contact metric manifolds. Normality of almost contact manifolds, related to the integrability of an almost contact structure. Sasakian manifolds, quasi-Sasakian manifolds, cosymplectic manifolds. Examples. Curvature of contact metric manifolds, with special attention to specific examples. φ-sectional curvature of Sasakian manifolds. (κ,μ)-contact metric manifolds. | | | | |

**Teaching methods:**
Lectures and exercise sections

**Auxiliary teaching:**

**Assessment methods:**
Oral exam

**Bibliography:**

D. E. Blair, Riemannian geometry of contact and symplectic manifolds. Second edition. Progress in Mthematics, 203. Birkäuser, Boston, 2010.

S. Kobayashi, K. Nomizu, Foundations of differential geometry. Interscience Publishers.

A. Moroianu, Lectures on Kähler geometry. London Mathematical Society Student Texts, 69. Cambridge University Press, Cambridge, 2007.

Ana Cannas da Silva, Lectures on Symplectic Geometry. Springer