Mathematical Institute
Polish Academy of Sciences

COURSE DESCRIPTION

Course name	"WaGaRy " – Workshop on Differential Geometry
Course type	research seminar (sd)
Supervisor	Janusz Grabowski
ECTS credit allocation	1 – IM PAN Ph. D. program; 3 – recommended for MA programs
Duration	One semester
Number of hours	30
Language	English or Polish, if every participant speaks Polish
Prerequisites	Basic knowledge in the field of Linear Algebra, Algebra, Calculus and Differential Geometry on undergraduate level.
Course content	Applications of differentia geometry, graded geometry, and supergeometry in various physical theories. Seminar talks are devoted to field theory, control theory, dynamics and geometry of quantum systems, entanglement and quantum information from the mathematical point of view.
Recommended reading	[1] R. Abraham, J. Marsden, J., Foundations of Mechanics, AMS Chelsea Publishing, 2008. [2] T. Aubin, A Course In Differential Geometry, AMS, Providence, 2000. [3] L. Auslander, Introduction to Differential Manifolds, New York : Mc-Graw-Hill Book Company, Inc., 1963. [4] C. J. Isham, Modern Differential Geometry for Physicists, World Scientific, London 1999. [5] S. Lang, Algebra, Springer, 2002. [6] K. C. H. Mackenzie, General theory of Lie groupoids and Lie algebroids, Cambridge University Press, 2005. [7] W. Rudin, Functional Analysis, New York : McGraw-Hill, 1991. [8] W. Rudin, Real and Complex Analysis, New York : McGraw-Hill, 1974. [9] A. Spivak, Comprehensive Introduction to Differential Geometry, Publish or Perish, Houston, 1999. [10] S. Sternberg, Lectures on Differential Geometry, Englewood Cliffs, N. J., Prentice Hall, 1964.
Learning outcomes	The active participant should gain basic knowledge about the mathematical language used in classical and quantum physics and contemporary research topics. He or she should be able to prepare a talk in the field of mathematical physics based on the appropriate literature. He or she should also be able to ask questions and take part in the discussions after talks related to the subject of the seminar.
Assessment methods and criteria	Assessment is based on attendance, activity and the quality of the prepared talk.
Remarks	