## Mathematical Institute Polish Academy of Sciences

## **COURSE DESCRIPTION**

Course Type	Co No	No. and the Committee Comm				
Supervisor   Piotr M. Hajac	Course Name	Noncommutative Geometry Seminar				
ECTS credit allocation   1 - IM PAN's Ph.D. programme, 3 - recommended for MA programs						
Duration         Each semester           Number of hours         30 per semester           Language         English           Prerequisites         MSc in mathematics           Course content         New research results in noncommutative geometry. Key topics are: noncommutative index theory and spectral triples, compact and locally compact topological quantum groups, Hopf-Galois theory and strong connections, Hopf-cyclic homology, Baum-Connes conjecture, deformation quantization, and universal quantum symmetries. Key words are: K-theory and K-homology of C*-algebras (K*-theory), Chern character, cyclic homology, Dirac operators, multiplicative unitaries, Hopf algebras.           Recommended reading         Papers of whoever gives a talk. For background reading, we recommend the following books:           1. Noncommutative Geometry by Alain Connes.         2. Basic Noncommutative Geometry by Masoud Khalkhali.           3. An Introduction to Noncommutative Geometry by Joseph C. Varilly.         4. Elements of Noncommutative Geometry by Joseph C. Varilly.           5. Local and Analytic Cyclic Homology by Ralf Meyer.         6. K-Theory for Operator Algebras by Bruce Blackadar.           7. Theory of C*-Algebras and Von Neumann Algebras by Bruce Blackadar.         8. An Introduction to K-Theory for C*-Algebras by M. Rørdam, Flemming Larsen, N. Laustsen.           9. K-theory and C*-algebras: A Friendly Approach by Niels Erik Wegge Olsen.         10. Analytic K-Homology by Nigel Higson, John Roe.           11. Hopf Algebras by Moss E. Sweedler.         12. Hopf Algebras by Brichi Abe.      <		•				
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		Talks are DVD-recorded and available online.				