Study programmes: PhD – Mathematics

Course name: Groups in geometry B

Lecturers: Srđan N. Vukmirović, Zoran P. Rakić, Miroslava Antić, Mirjana Đ. Đorić

Status: Optional (compulsory for students in Geometry)

ECTS: 9

Attendance prerequisites: Lie groups and algebras

Course aims: Acquisition of general and specific knowledge in foundations of theory of Lie groups and algebras. Preparing student for individual scientific work: studying of literature in Lie groups and algebras and gradually including student for individual research work.

Course outcome: Upon completion of the course, the student has necessary knowledge about: compact Lie groups, semisimple Lie groups and algebras, reflections and root systems, Weyl's theorem, real forms of complex semisimple Lie algebras, classification of complex semisimple Lie algebras. Student is qualified to individual understanding basic examples and solving problems from this theory. Also, student is qualified for to individual studying research papers.

Course content: Covariant tensor fields on Lie group. Volume form. Compact Lie groups. Semisimple Lie groups and algebras. Complex Lie groups. Metric. Cartan subalgebra. Reflections and root systems. Weyl's group. Simple roots and basis of root system. Lie bracket and roots. Real forms of complex semisimple Lie algebras. Classification of complex semisimple Lie algebras.

Literature:

1. Alfred Gray, Lie groups, 1993, skripta.
2. A. W. Knapp, Lie groups, Lie Algebras and Cohomology, 1988, Mathematical Notes 34, Princeton University Press.
3. Hall B.C., Lie Groups, Lie Algebras, and Representations, 2003, GTM, Vol. 222, Springer-Verlag, New York-Heidelberg-Berlin

Number of hours: 10	**Lecures: 4**	**Tutorials: -**	**Laboratory: -**	**Research: 6**

Teaching and learning methods: Lectures/ Tutorials

Assessment (maximal 100 points)

Course assignments	**points**	**Final exam**	**points**
Lectures	-	Written exam	-
Exercises / Tutorials	20	Oral exam	60
Colloquia	-	Written-oral exam	-
Essay / Project	20		