Study program	Level of studies		**Third cycle**	
	Title of the study program		**Doctoral studies in physics**	
Course title	**PATH INTEGRALS AND SEMICLASSICAL PHYSICS**			
Course ID	Semester	Course status	ECTS credits	Teaching hours
PTH7041	**I/II**	**Elective**	**10**	**30**
Course aims and expected learning outcomes	Introducing students to the concepts and mathematical apparatus of path integrals and semiclassical physics. Student should be able to apply this method when solving specific problems.			

COURSE CONTENT

Basics of path integrals and solutions to simple problems. Semiclassical temporal evolution. Semiclassical trace formula. Gutzwiller formula for isolated orbits. Selected problems and applications.

LITERATURE

H. Kleinert, *Path Integrals in Quantum Mechanics, Statistics, Polimer Physics, and Financial Markets*, 5th ed., World Scientific, Singapore, 2009.

M. Brack, R. K. Bhaduri, *Semiclassical Physics*, Frontiers in Physics, Vol. 96, Addison Wesley, Reading, 1997.

R. P. Feynman, A. R. Hibbs, *Quantum Mechanics and Path Integrals*, McGraw-Hill, New York, 1965.

L. S. Schulman, *Techniques and Applications of Path Integration*, Wiley, New York, 1981.

W. Dittrich, M. Reuter, *Classical and Quantum Dynamics – from Classical Paths to Path Integrals*, 2nd ed., Springer-Verlag, Berlin, 1994.

D. J. Tannor, *Introduction to Quantum Mechanics. A Time-Dependent Perspective*, University Science Books, Sausalito, California, 2007.

M. C. Gutzwiller, *Chaos in Classical and Quantum Mechanics*, Springer-Verlag, New York, 1990.

C. Grosche, F. Steiner, *Handbook of Feynman Path Integrals*, Springer, 1998.

M. S. Child, *Molecular Collision Theory*, Dover, Mineola, New York, 1996.

ASSESSMENT OF LEARNING

Assessment Method	Points
Homework	20
Seminar papers	40
Final exam	40
Total	100

Remarks