Study programmes: BACHELOR STUDIES - Mathematics	
Course name: Partial Equations	
Lecturers: Miodrag Mateljević	
Status: Optional	
ECTS: 5	
Attendance prerequisites: No prerequisites.	
Course aims: Acquiring general and specific knowledge about partial equations.	
Course outcome: Upon completion of the course, the student has a basic knowledge about partial equations and their solving. He knows the basic results of the theory of distributions and the Sobolev space, understands the concept of a generalized solution.	

Course content:

1. BASIC NOTIONS OF THE THEORY OF DISTRIBUTIONS

The space of test functions (D) and the space of distributions (D') . Support of distribution. Regular and singular distribution. Change of variables. Product of function and distribution. Derivative of distribution. Primitive distribution. Direct product of distributions. Convolution of distributions. Algebra D'+. Ragularization of distributions. Newton potential. Tempered distributions. Fourier transform.

2. SOBOLEV SPACES

Spaces of integrable functions. Sobolev spaces $H^k(\Omega)$. Averaging of function. Extension of function with preservation of class. Separability of $H^k(\Omega)$. Spaces $H^k_0(\Omega)$. Trace of function. Continuity of trace. Partial integration. Compact sets in Sobolev spaces. Equivalent norms on the spaces $H^1(\Omega)$ and $H^1_0(\Omega)$. Integral representation of functions in the space $H^k(\Omega)$. Embeddings theorems.

3. BOUNDARY VALUE PROBLEMS FOR LINEAR ELLIPTIC PDE

Classical and generalized solutions of boundary value problems. Existence of generalized solution (the simplest case). Eigenvalues and eigenfunctions. Existence of generalized solution (homogeneous boundary condition). Non-homogeneous boundary condition. Smoothness of generalized solution.

Literature:
1. B. Jovanović, Parcijalne i integralne jednačine, Zavod za udžbenike Beograd, 2010.
2. L. C. Evans, Partiual Differential Equations (second edition), 2010.

Number of hours: 4	**Lectures**: 2	**Tutorials**: 2	**Laboratory**: -	**Research**: -

Teaching and learning methods: Frontal / Tutorial

Assessment (maximal 100 points)			
Course assignments	**points**	**Final exam**	**points**
Lectures	5	Written exam	35
Exercises / Tutorials	-	Oral exam	30
Colloquia	15+15	Written-oral exam	-
Essay / Project	-		