



Course title	Calculus of Variations
Institute/Division	Faculty of Computer Science and Mathematics/ Department of Mathematics
Course code	F-2.CV
Erasmus subject code*	11.1
Number of contact hours**	45 lecture hours (45h)
Course duration	1 semester (Spring)
ECTS credits	6
Course description (max 100 words)	Integral functionals, weak and strong local extrema. The Euler-Lagrange equation as a necessary condition for a weak local extremum. Higher dimensional problems. Variational problems with higher-order derivatives. Problems with variable endpoints, natural boundary conditions, transversality conditions. Isoperimetric problems, Lagrange multipliers. Jacobi's equation, a sufficient condition for a weak local extremum. Variational problems with integrals involving more than one independent variable. An introduction to the optimal control theory.
Literature	L. Komzsik — Applied Calculus of Variations for Engineers, Boca Raton, 2009, CRC Press L. Elsgolts — Differential Equations and the Calculus of Variations, Moscow, 1977, Mir Publishers H. Sagan — Introduction to the Calculus of Variations, New York, 1992, Dover Publications
Course type/organization	<ul style="list-style-type: none">• Lectures (30h),• Exercises (15h)
Assessment method	Attendance, two tests during the semester, final exam
Prerequisites	Basic results from calculus of one and several variables, ordinary differential equations
Primary target group	Computer Science, Mathematics
Contact person	Margareta Wiciak, e-mail: mwiciak@pk.edu.pl
Remarks	

*please insert one of the following codes:

- 11.0 Mathematics, Informatics
- 11.1 Mathematics
- 11.2 Statistics
- 11.3 Informatics, Computer Science
- 11.4 Artificial Intelligence
- 11.5 Actuarial Science
- 11.9 Others Mathematics, Informatics

**1 lecture hour=45 minutes