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| Course title | Calculus of Variations |
| Institute/Division | Faculty of Computer Science and Telecommunication/ 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. Komzisk — 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