

Course content for International Master program „Mathematical modeling, computation and optimization“

<b>Course name</b>	Variational methods
<b>Contents and Objectives</b>	<p><u>Content:</u></p> <ul style="list-style-type: none"> <li>• Boundary value tasks and initial boundary value problems in linear partial differential equations for selected physical and technical applications</li> <li>• Linear Operators and Functionals in Hilbert Spaces</li> <li>• Variational formulation of boundary value problems in elliptic differential equations</li> <li>• Calculus of variations</li> </ul> <p><u>Objectives of the course:</u> The aim of this module is an introduction to mathematical modeling physical processes that lead to partial differential equations and the mathematical analysis of the resulting problems. Basic concepts and results of functional analysis are taught.</p> <p>With this knowledge, students also acquire the ability to formulate problems of applied sciences in precise mathematical form, to understand related theorems and gain the ability give proofs.</p>
<b>Teaching</b>	<p>This course consists of lectures and exercise classes.</p> <ul style="list-style-type: none"> <li>• Lecture: Variational methods (4h/week)</li> <li>• Exercise class: Variational methods (2h/week)</li> </ul>
<b>Prerequisites</b>	Basic notions of Linear Algebra and Analysis
<b>Examination</b>	Oral exam (30 minutes)
<b>Credits</b>	8 ECTS points
<b>Frequency</b>	This course is given at least every second year.
<b>Workload</b>	The estimated total working time for this course is 240 hours.
<b>Duration</b>	This course is given during one semester.