

<b>Study Programme:</b> Geodesy
<b>Course Unit Title:</b> Calculus
<b>Course Unit Code:</b>
<b>Name of Lecturer(s):</b> Associate Professor Vukan Ogrizović
<b>Type and Level of Studies:</b> Bachelor Academic Degree
<b>Course Status (compulsory/elective):</b> Compulsory
<b>Semester (winter/summer):</b> Summer
<b>Language of instruction:</b> English
<b>Mode of course unit delivery (face-to-face/distance learning):</b> Face-to-face
<b>Number of ECTS Allocated:</b> 5
<b>Prerequisites:</b> None
<b>Course Aims:</b> Introducing basic Calculus terms, methods of unknown parameters estimation, and quality analysis of obtained estimations in geodetic models
<b>Learning Outcomes:</b> Successful using of acquired knowledge of unknown parameters estimation and quality analysis of the results of geodetic measurements in geodetic models.
<b>Syllabus:</b> <i>Theory</i> <ol style="list-style-type: none"> <li>1. Least squared methods principle. Functional and stochastic models.</li> <li>2. Direct adjustment. Gauss-Markov model. Estimation methods.</li> <li>3. Direct adjustment. Error equations of various measured quantities.</li> <li>4. Quality parameters of geodetic networks - accuracy and reliability. Local and global quality measures.</li> <li>5. Estimation of unknown parameters applying the least squares method. Accuracy of indirect estimations.</li> <li>6. Evaluated functions. Error ellipses, confidence ellipses, and confidence ellipsoids. Confidence intervals. Hypothesis testing.</li> <li>7. Blunders tests. Issues of geodetic datum, datum defect, S-transformation</li> <li>8. Test I</li> <li>9. Direct adjustment with conditions - model, estimation models.</li> <li>10. Linear regression - model, evaluable functions, hypothesis testing.</li> <li>11. Transformation models of planar coordinates - Helmert, affine,...</li> <li>12. Conditional adjustment - linear model and least squares estimation.</li> <li>13. Estimation of unknown parameters in conditional models.</li> <li>14. Significance testing of differences obtained estimations and expected (a priori) values.</li> <li>15. Test II</li> </ol> <i>Practice</i> Practice follows the lectures dynamics.
<b>Required Reading:</b> <ol style="list-style-type: none"> <li>1. G. Perović: Least Squares Method, Author, Belgrade, 2005.</li> </ol>

<b>Weekly Contact Hours:</b> 60	<b>Lectures:</b> 30	<b>Practical work:</b> 30	
<b>Teaching Methods:</b> Lectures and students group work			
<b>Knowledge Assessment (maximum of 100 points): 100</b>			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
Active class participation	5	written exam	
Test I and Test II	5 (practice) + 40	oral exam	50
Preliminary exam(s)		.....	
Seminar(s)			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			