



# UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Mathematics Department

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## Doctoral Program in Mathematics

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**MODULE HANDBOOK**  
Doctoral in Mathematics

<b>Module name:</b>	<b>Komputasi Statistika Terapan (Applied Statistical Computing)</b>												
<b>Module level, if applicable:</b>	Master / Doctoral Program												
<b>Code, if applicable:</b>	MMM-5603												
<b>Semester(s) in which the module is taught:</b>	1 (odd term)												
<b>Person responsible for the module:</b>	Chair of Statistical Computing Research Group												
<b>Lecturer(s):</b>	1. Prof. Dr.rer. nat. Dedi Rosadi, M.Sc 2. Drs. Danardono, MPH, Ph.D												
<b>Language:</b>	Indonesia												
<b>Relation to curriculum:</b>	Elective Course												
<b>Credit points:</b>	3 Semester Credit Unit												
	3x50 minute lectures, 3x60 minutes structured activities.												
<b>Workload:</b>	<ul style="list-style-type: none"> <li>• 3x50 minutes lectures,</li> <li>• 3x60 minutes structured activities,</li> <li>• 3x60 minutes individual study,</li> <li>• In 16 weeks per semester (including assignments and examinations)</li> </ul>												
<b>Recommended prerequisites:</b>	Mathematical Statistics												
<b>Module objectives/intended learning outcomes:</b>	On successful completion of this course, students should be able to: CO1. Explain method and concept in statistical computing and application CO2. Implement R Software for statistical computation and application CO3. Analyze output of a statistical software for statistical computation and application												
<b>Content:</b>	Concepts in Statistical computing. Using R and Programming with R. Using R-Excel, RGUI, Rcommanderplugin SPSS and others R-GUI. Monte Carlo Simulation, Numerical Optimization, Linear Programming, Symbolic computation: application and implementation using R. Introduction to data mining/machine learning/statistical learning. Other statistical computing topics.												
<b>Study and examination requirements and forms of examination:</b>	<p>The final mark will be weighted as follows:</p> <table border="1"> <thead> <tr> <th>No</th> <th>Assessment methods (components, activities)</th> <th>Weight (percentage)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Final Examination</td> <td>35%</td> </tr> <tr> <td>2</td> <td>Mid-Term Examination</td> <td>35%</td> </tr> <tr> <td>3</td> <td>Projects/Presentation</td> <td>30%</td> </tr> </tbody> </table> <p>Final grade will be determined as follows: Grade Criteria The initial cut-off points for grades A, B, C, and D should not be less than 80%, 65%, 50%, and 40%, respectively.</p>	No	Assessment methods (components, activities)	Weight (percentage)	1	Final Examination	35%	2	Mid-Term Examination	35%	3	Projects/Presentation	30%
No	Assessment methods (components, activities)	Weight (percentage)											
1	Final Examination	35%											
2	Mid-Term Examination	35%											
3	Projects/Presentation	30%											
<b>Media employed:</b>	Board, LCD Projector, Laptop/Computer												
<b>Reading List:</b>	1. Braun..D., 2008, A First Course in Statistical Programming with R, Cambridge University Press												

	<ol style="list-style-type: none"> <li>2. Heiberger, R.M., Neuwirth, E., 2009, R Through Excel: A Spreadsheet Interface for Statistics, Data Analysis, and Graphics, Springer</li> <li>3. Martinez, W.L. and Martinez, AR, 2007, Computational Statistics Handbook with MATLAB, Chapman &amp; Hall, New York</li> <li>4. Rosadi, D., 2011, Analisa Ekonometrika dan Runtun Waktu Terapan dengan R, Andi Offset, Yogyakarta</li> <li>5. Rosadi, D., 2017, Analisa Statistika Terapan dengan R, GamaPress</li> </ol>
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### Mapping of the COs and PLOs

	PLO - 1 S3 Mat	PLO - 2 S3 Mat	PLO - 3 S3 Mat	PLO - 4 S3 Mat	PLO - 5 S3 Mat	PLO -6 S3 Mat
CO 1	X	X				X
CO 2				X	X	
CO 3			X			

#### Programme Learning Outcomes (PLO) Doctoral Programme in Mathematics

<b>PLO-1</b>	:	<p><b>Attitude:</b></p> <p>Devote to God Almighty, uphold the humanity values, internalize academic values and ethics, responsible in working in the area of expertise independently.</p>
<b>PLO-2</b>	:	<p><b>Knowledge:</b></p> <p>Mastering philosophy of mathematics and one of the fields in mathematics (algebra, analysis, applied mathematics, statistics, computational mathematics, computational statistics).</p>
<b>PLO-3</b>	:	<p><b>Knowledge:</b></p> <p>Able to think logically, analytically, inductively, deductively, and structured; having the ability to manage, lead, and develop research programs independently, and able to communicate the thoughts as well as his work to the scientific community and the general public.</p>
<b>PLO-4</b>	:	<p><b>Skill:</b></p> <p>Creating new concepts and / or new methods (original) in the field of mathematics that are recognized nationally and internationally.</p>
<b>PLO-5</b>	:	<p><b>Skill:</b></p> <p>Able to apply mathematics according to their field of expertise to solve problems including those that require a multidisciplinary, cross-disciplinary, or trans-disciplinary approach.</p>
<b>PLO-6</b>	:	<p><b>Life Long Learning:</b></p> <p>Having lifelong learning skills and adaptive to the development of science and technology, especially in fields related to Mathematics and its applications.</p>