



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

Module name:	Advanced Statistical Computing															
Module level, if applicable:	Doctoral															
Code, if applicable:	MMM 7405															
Semester(s) in which the module is taught:	2 nd (second) year															
Person responsible for the module:	Chair of Statistical Computing Research Group															
Lecturer(s):	Prof. Dr.rer.nat. Dedi Rosadi, S.Si., M.Sc./Dr.Danardono															
Language:	Bahasa Indonesia															
Relation to curriculum:	Doctoral Degree in Mathematics, Elective Course															
Credit points:	3 Semester Credit Unit															
Type of teaching, contact hours:	3x50 minutes lectures, 3x60 minutes structured activities.															
Workload:	3 hours lectures, 3 hours structured activities, 3 hours individual study, 16 weeks per semester (including mid-term and final examinations), 144 hours per semester.															
Recommended prerequisites:	Students have learned some basic knowledge on statistical computing Students also have some basic knowledge on statistical software, such as R and Python															
Module objectives/intended learning outcomes:	After completing this course the students have ability to : CO 1. understand some basic topics in statistical computing such as numerical analysis, statistical data analysis, introduction to graphical data visualization CO2.. be able to use statistical software to implement the statistical computing in practice and have ability to extend the software to implement new statistical method CO3. Understand some advanced topics in statistical computing such as advanced data visualization, data crawling, introduction to big data analytics, etc.															
Content:	Overview statistical computing, some basic topic in statistical computing: numerical analysis, statistical data analysis, introduction to graphical data visualization, some advanced topics in statistical computing : advanced data visualization, data crawling, introduction to big data analytics, etc, implementation in statistical softwares															
Study and examination requirements and forms of examination:	The final mark will be weighted as follows: <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>30%</td> </tr> <tr> <td>3</td> <td>Projects/Presentation</td> <td>25%</td> </tr> <tr> <td>4</td> <td>Peer Assessment/Quiz</td> <td>10%</td> </tr> </tbody> </table> 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.	No	Assessment methods (components, activities)	Weight (percentage)	1	Final Examination	35%	2	Mid-Term Examination	30%	3	Projects/Presentation	25%	4	Peer Assessment/Quiz	10%
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1	Final Examination	35%														
2	Mid-Term Examination	30%														
3	Projects/Presentation	25%														
4	Peer Assessment/Quiz	10%														
Media employed:	Board, LCD Projector, Laptop/Computer															

Reading List:	<ol style="list-style-type: none"> Härdle, W.K., Lu, H. H and Shen, X. , 2018, Handbook of Big Data Analytics, Springer Recent publication on statistical computing and big data analytics
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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	v	v	v		v	
CO 2	v	v	v		v	v
CO 3	v	v	v		v	v

Programme Learning Outcomes (PLO) Doctoral Programme in Mathematics

PLO-1	:	<p>Attitude:</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>
PLO-2	:	<p>Knowledge:</p> <p>Mastering philosophy of mathematics and one of the fields in mathematics (algebra, analysis, applied mathematics, statistics, computational mathematics, computational statistics).</p>
PLO-3	:	<p>Knowledge:</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>
PLO-4	:	<p>Skill:</p> <p>Creating new concepts and / or new methods (original) in the field of mathematics that are recognized nationally and internationally.</p>
PLO-5	:	<p>Skill:</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>
PLO-6	:	<p>Life Long Learning:</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>