



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:	Financial Modeling															
Module level, if applicable:	Doctoral															
Code, if applicable:	MMM 5436															
Semester(s) in which the module is taught:	1 st (first) year															
Person responsible for the module:	Chair of Statistics Research Group															
Lecturer(s):	Danang Teguh Qoyyimi, M.Sc., Ph.D.															
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 background knowledge on financial products and derivatives, how they are traded, and their role in financial system.															
Module objectives/intended learning outcomes:	After completing this course the students have ability to: CO 1. Understand financial markets, derivative products, and some basic principle in option pricing CO 2. Apply Binomial tree approach in option pricing. CO 3. Understand brownian motion and basic stochastic calculus. CO 4. Apply stocastic calculus to option pricing.															
Content:	<ol style="list-style-type: none"> 1. Derivative markets 2. Binomial tree model 3. Discrete-time securities market 4. Brownian motion and stochastic calculus 5. Option pricing and hedging under continuous-time markets 															
Study and examination requirements and forms of examination:	<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>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> <p>Final grade will be determined as follows:</p> <p>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	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, online materials															
Reading List:																

	<ol style="list-style-type: none"> 1. Shreve, S. E., 2005, Stochastic Calculus for Finance I: The Binomial Asset Pricing Model, Springer, New York. 2. Shreve, S. E., 2008, Stochastic Calculus for Finance II: Continuous-Time Models, Springer, New York.
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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	v
CO 2	v	v	v			
CO 3	v	v	v			v
CO 4	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>