UNIVERSITAS GADJAH MADA
Faculty of Mathematics and Natural Sciences
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Doctoral Program in Mathematics

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MODULE HANDBOOK
Doctoral in Mathematics

Module name:	**Option Pricing Theory**
Module level, if applicable:	Doctoral Program
Code, if applicable:	MSM 7416
Semester(s) in which the module is taught:	1
Person responsible for the module:	Chair of Statistics Research Group
Lecturer(s):	1. Dr. Abdurakhman
Language:	Bahasa Indonesia
Relation to curriculum:	Doctoral Degree in Mathematics, Compulsory / Elective Course
Credit points:	3 Semester Credit Unit
Type of teaching, contact hours:	3x50 minutes lectures, 3x60 minutes structured activities.
Workload:	• 3x50 minutes lectures, • 3x60 minutes structured activities, • 3x60 minutes individual study, • In 16 weeks per semester (including assignments and examinations)
Recommended prerequisites:	-
Module objectives/intended learning outcomes:	On successful completion of this course, students should be able to: CO 1: Students are able to understand stochastic model CO 2: Students are able to evaluate the existing model and the latest approach in option pricing theory CO 3: Student are able to grab the idea how to develope the new model in the option pricing theory
Content:	Contents of this lecture consist of : 1. Stochastics and phyloshopy 2. Stock price Geometrik Brownian Motion model 3. Simulation 4. Black Scholes Model 5. Black Scholes Extended Model 6. Comparations 7. Discrete approach : Binomial Option 8. Bermuda Option 9. Exotic Option Model 1 10. Exotic Option Model 2 11. Option pricing theory and relation in other field 1 : Bond Valuation 12. Option pricing theory and relation in other field 2 : Actuarial Science
Study and examination requirements and forms of examination:	The final mark will be weighted as follows: No (components, activities) Weight (percentage) 1 Homework 20 2 Paper assignment 50

	3 Discussion 30 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. Grade scale: A: 80≤score; C: 40≤score<50 A/B: 70≤score<80; D: 20≤score<40 B: 60≤score<70; E: score<20 B/C: 50≤score<60
Media employed:	Slides, White Boards
Reading List:	1. John C Hull, Options, Futures, and Other Derivatives, 6th Edition, Prentice Hall, 2005. 2. Wilmott, P, Introduces Quantitative Finance, John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ, England 3. Andrew T Adam, Investment Mathematics, John Wiley and Sons, 2003 4. David G. Luenberger, Investment Science, Oxford University Press, 1998 5. An Introduction to Financial option Valuation, Mathematics, Stochastics and Computation, Second Edition, Cambridge University Press *2004*.

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				
CO 2			x			
CO 3				x		

Programme Learning Outcomes (PLO) Doctoral Programme in Mathematics

PLO-1	:	**Attitude:** Devote to God Almighty, uphold the humanity values, internalize academic values and ethics, responsible in working in the area of expertise independently.
PLO-2	:	**Knowledge:** Mastering philosophy of mathematics and one of the fields in mathematics (algebra, analysis, applied mathematics, statistics, computational mathematics, computational statistics).
PLO-3	:	**Knowledge:** 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.
PLO-4	:	**Skill:** Creating new concepts and / or new methods (original) in the field of mathematics that are recognized nationally and internationally.
PLO-5	:	**Skill:**

		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.
PLO-6	:	***Life Long Learning:*** Having lifelong learning skills and adaptive to the development of science and technology, especially in fields related to Mathematics and its applications.