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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:	**Proses Stokastik (Stochastic Processes)**
Module level, if applicable:	Doctoral Program, Master Program
Code, if applicable:	MMM-5403
Semester(s) in which the module is taught:	2 (even term)
Person responsible for the module:	Chair of Statistics Research Group
Lecturer(s):	1. Drs. Danardono, MPH, Ph.D 2. Dr. Abdurakhman, M.Si.
Language:	Indonesia
Relation to curriculum:	Doctoral Degree in Mathematics, Elective Course
Credit points:	3 Semester Credit Unit
`	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:	Mathematical Statistics
Module objectives/intended learning outcomes:	On successful completion of this course, students should be able to: CO1. Explain Markov Chain, theory underlying Markov Chain, Chain classification, limiting distribution of transition matrix and apply the models into real world problems CO2. Explain Poisson Process, the underlying theory and apply the models into real world problems CO3. Explain Brownian Motion, the underlying theory, simulate Brownian Motion and apply the models into real world problems CO4. Explain Queueing theory and apply the models into real world problems CO5. Construct stochastic models from a real world phenomenon
Content:	Markov Chain, Markov Chain, Chain classification, limiting distribution of transition matrix. Poisson Process. Continuous Markov Chain. Brownian Motion. Queueing Theory.
Study and examination requirements and forms of examination:	The final mark will be weighted as follows: No — Assessment methods (components, activities) — Weight (percentage) 1 — Final Examination — 35% 2 — Mid-Term Examination — 35% 3 — Projects/Presentation — 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.

Media employed:	Board, LCD Projector, Laptop/Computer
Reading List:	1. Ross, S.M., 1996, *Stochastic Processes*, John Wiley & Sons. 2. Ross, S.M., 2010, *Introduction to Probability Models*, 10th ed., Academic Press 3. Stirzaker, D, 2005, *Stochastic Processes and Models*, Oxford University Press.

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**			**X**	
CO 3	**X**	**X**			**X**	
CO 4	**X**	**X**			**X**	
CO 5	**X**	**X**			**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.