UNIVERSITAS GADJAH MADA
Faculty of Mathematics and Natural Sciences
Mathematics Department
Sekip Utara Bulaksumur Yogyakarta 55281 Telp: +62 274 552243 Fax: +62 274 555131 Email: math@ugm.ac.id Website: http://math.fmipa.ugm.ac.id

Undergraduate Programme in Mathematics
Telp : +62 274 552243
Email : maths1@ugm.ac.id; kaprodi-s1-matematika.mipa@ugm.ac.id
sekprodi-s1-matematika.mipa@ugm.ac.id
Website : http://s1math.fmipa.ugm.ac.id/

MODULE HANDBOOK

Module name	Introduction to Stochastic Processes		
Module level, if applicable	Bachelor		
Code, if applicable	MMS-3002		
Subtitle, if applicable	-		
Courses, if applicable	Introduction to Stochastic Processes		
Semester(s) in which the module is taught	5th (fifth)		
Person responsible for the module	Chair of the Department of Mathematics		
Lecture(s)	Dr. Irwan Endrayanto A, S.Si., M.Sc Drs. Danardono, MPH., Ph.D.		
Language	Bahasa Indonesia		
Relation to curriculum	Compulsory course in the third year (5th semester) Bachelor Degree		
Type of teaching, contact hours	150 minutes lectures and 180 minutes structured activities per week.		
Workload	Total workload is 136 hours per semester, which consists of 150 minutes lectures per week for 14 weeks, 180 minutes structured activities per week, 180 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam.		
Credit points	3		
Requirements according to the examination regulations	Students have taken Introduction to Stochastic Processes course (MMM-3002) and have an examination card where the course is stated on.		
Recommended prerequisites	Students have taken Introduction to Probability Model course (MMM-2410) and have participated in the final examination of the course.		
Module objectives/intended learning outcomes	CO.1. Students are able to define various types of stochastic processes and explain the features that distinguish different types of stochastic processes from one another. CO.2. Students are able to derive often-used theoretical properties of stochastic processes. CO.3. Students are able to apply both analytical and computational techniques to solve stochastic models.		
Content	Week	Topic	Sub-Topic
	1.	Introduction Stochastic Processes and its applications	- Definition and Examples - Inter-Arrival and Waiting Time Distribution
	2.	The Poisson Process	- Non-homogeneous Poisson Process.
	3.		
	4.		
	5.	Discrete Time Markov Chains	- Classification of States
	6.		- Measure of Stationary Probabilities
	7.		- Finite Markov Chain
	8.	Mid-exam	-
	9.	Discrete Time Markov Chains	- Countable Markov Chain
	10.	Continuous Time Markov Chains	- Birth and Death Processes
	11.		- Time reversible
	12.	Applications to queueing theory	- Regenerative Processes
	13.	The Renewal Theory	- Applications of the Renewal Theory
	14.		

	15. 16.	Brownian Motion and Stationary Final exam	- The use of the Brownian motion -
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 30 2 Mid-Term Examination 25 3 Presentation 15 4 Class Activities: Quiz, Homework, etc. 20 5 Peer Assessment 10 The initial cut-off points for grades A, B, C, and D should not be less than 80%, 70%, 50%, and 40%, respectively.		
Media employed	Projector, board, e-learning via http://elisa.ugm.ac.id		
Reading List	1. Shelldon M. Ross, 2010, *Introduction to Probability Models.* 10th edition.California. Academic Press 2. Gregory F. Lawler, 2006, *Introduction to Stochastic Processes,* Chapman & Hall/CRC Probability Series. 3. Wayne L. Winston, 2003, *Operations Research: Applications and Algorithms,* Duxbury Press. 4. Sheldon M. Ross, 1996, *Stochastic Processes.* 2nd editon. John Wiley & Sons,Inc. 5. Randolph Nelson, 1995, Probability, Stochastic Processes and Queueing Theory, The Mathematics of Computer Performance Modeling, Springer-Verlag. 6. Paul G. Hoel, Sidney C. Port dan Charles J. Stone, 1972, Introduction to Stochastic Processes. Houghton Mifflin Company.		

PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
CO 1			v		v				v
CO 2			v		v				v
CO 3			v		v				v