UNIVERSITAS GADJAH MADA
Faculty of Mathematics and Natural Sciences
Department of Mathematics
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Doctor in Mathematics

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MODULE HANDBOOK

Module Name	**Topics in Mathematics Statistics A**
Code, if applicable	**MMM 7424**
Subtitle, if applicable	
Semester(s) in which the module is taught	1st or 2nd semester
Person responsible for the module	Chair of Statistics Laboratory
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the 1st or 2nd semester of doctor's degree
Teaching methods	Lecture, classroom discussion, flipped classroom.
Workload (incl. contact hours, self-study hours)	*Total workload is 232 hours per semester, which consists of 50 minutes lectures per week, 120 minutes of structured activities per week, 120 minutes of individual study per week, in total is 16 weeks per semester, including mid exam and final exam.*
Credit points in Credit Units	*3*
Required and recommended prerequisites for joining the module	The students have a strong grasp of the fundamentals of Mathematical Statistics.
Module objectives/intended learning outcomes	On successful completion of this course, students should be able to: CO 1 Proficient in the definitions and theorems of Mathematical Statistics. CO 2 Proficient in stochastic processes. CO 3 Mastered the development of distribution functions.

Content	Sigma Fields, measures, probability, random variables and their distributions, integral theory and its relation to expectations, various types of convergence, several versions of the central limit theorem. The topics and syllabus details of this course will be determined in relation to the research topic of the student.
Examination forms	*oral presentation and essay.*
Study and examination requirements	The final mark will be weighted as follows: No — Assessment methods (components, activities) — Weight (percentage) 1 — Final Examination (portfolio/essay/oral presentation) — 35% 2 — Mid-Term Examination (portfolio/essay/presentation) — 35% 3 — Class Activities: Presentation — 30% To pass the course, the minimum grade is B.
Media employed	online platforms, Learning management systems, LCD projectors, and whiteboards.
Reading list	1. Ash, R. B. (1972). Real Analysis and Probability. Academic Press. 2. Rosenthal, J. S., 2006, A First Look at Rigorous Probability Theory, World Scientific. 3. Shorack, G. R., 2000, Probability for Statisticians, Springer.

CO-PLO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CO 1	v				v	v
CO 2	v	v			v	v
CO 3	v		v		v	v

Compilation Date : 2/1/2023

Modified Date : 30/1/2024

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MODULE HANDBOOK

Module Name	**Topics in Mathematics Statistics A**
Code, if applicable	**MMM 7424**
Subtitle, if applicable	Advance Mathematics Statistics
Semester(s) in which the module is taught	1st or 2nd semester
Person responsible for the module	Chair of Statistics Laboratory
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the 1st or 2nd semester of doctor's degree
Teaching methods	Lecture, classroom discussion, flipped classroom.
Workload (incl. contact hours, self-study hours)	*Total workload is 232 hours per semester, which consists of 50 minutes lectures per week, 120 minutes of structured activities per week, 120 minutes of individual study per week, in total is 16 weeks per semester, including mid exam and final exam.*
Credit points in Credit Units	*3*
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	On successful completion of this course, students should be able to: CO 1 master the Fundamental of Probability Theory and Mathematical Statistics CO 2 develop estimation methods in the Parametric and Non-Parametric Models CO 3 develop Hypothesis tests and confidence set

<table>
<tr><td>Content</td><td>The Fundamental of Probability Theory and Mathematical Statistics, Estimation in the Parametric and Non-Parametric Models, Hypothesis tests, confidence set</td></tr>
<tr><td>Examination forms</td><td>oral presentation and essay.</td></tr>
<tr><td>Study and examination requirements</td><td>The final mark will be weighted as follows:
<table><tr><th>No</th><th>Assessment methods (components, activities)</th><th>Weight (percentage)</th></tr><tr><td>1</td><td>Final Examination (portfolio/essay/oral presentation)</td><td>35%</td></tr><tr><td>2</td><td>Mid-Term Examination (portfolio/essay/presentation)</td><td>35%</td></tr><tr><td>3</td><td>Class Activities: Presentation</td><td>30%</td></tr></table>
To pass the course, the minimum grade is B.</td></tr>
<tr><td>Media employed</td><td>online platforms, Learning management systems, LCD projectors, and whiteboards.</td></tr>
<tr><td>Reading list</td><td>1. Shao, J., 1999, Mathematical Statistics, Springer Verlag New York. Inc.
2. Roussas, G. G., 1997, A Course in Mathematical Statistics, Second Editon, Academic Press.
.</td></tr>
</table>

CO-PLO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CO 1	v				v	v
CO 2		v			v	
CO 3			v		v	

Compilation Date : 2/1/2023

Modified Date : 30/1/2024

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MODULE HANDBOOK

Module Name	Topic on Mathematical Statistics A
Code, if applicable	**MMM 7424**
Subtitle, if applicable	Linear Model
Semester(s) in which the module is taught	1st or 2nd semester
Person responsible for the module	Chair of Statistics Laboratory
Language	Bahasa Indonesia
Relation to curriculum	Elective course
Teaching methods	Lecture, classroom discussion, flipped classroom, project.
Workload (incl. contact hours, self-study hours)	*Total workload is 232 hours per semester, which consists of 50 minutes lectures per week, 120 minutes of structured activities per week, 120 minutes of individual study per week, in total is 16 weeks per semester, including mid exam and final exam.*
Credit points	3
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	On successful completion of this course, students should be able to: CO 1 master the Characteristics of the Linear Model CO 2 master Variable Selection CO 3 perform Shrinkage Methods CO 4 develop Statistical Strategy and Model Uncertainty

Content	Characteristics of the Linear Model, Variable Selection, Shrinkage Methods, Statistical Strategy and Model Uncertainty
Examination forms	*oral presentation and essay.*
Study and examination requirements	The final mark will be weighted as follows: No — Assessment methods (components, activities) — Weight (percentage) 1 — Final Examination (portfolio/essay/oral presentation) — 35% 2 — Mid-Term Examination (portfolio/essay/presentation) — 35% 3 — Class Activities: Presentation — 30% To pass the course, the minimum grade is B.
Media employed	online platforms, Learning management systems, LCD projectors, and whiteboards.
Reading list	Faraway, J. J., 2005, *Linear Models with R*, Chapman & Hall/CRC.

CO-PLO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CO 1	v					v
CO 2	v	v				v
CO 3	v		v			v
CO 4	v			v		v

Compilation Date : 2/1/2023

Modified Date : 1/2/2023

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MODULE HANDBOOK
Doctoral in Mathematics

Module name:	Topik dalam Statistika Matematika A *(Topics in Mathematical Statistics A)*
Code, if applicable:	MMM 7424
Subtitle, if applicable	Stochastic Processes
Semester(s) in which the module is taught:	1st or 2nd semester
Person responsible for the module:	Chair of Statistics Research Group
Language:	Bahasa Indonesia
Relation to curriculum:	Doctoral Degree in Mathematics, Elective Course
Teaching methods	Lecture, classroom discussion, project-based learning.
Workload (incl. contact hours, self-study hours)	Total workload is 232 hours per semester, which consists of 50 minutes lectures per week, 120 minutes of structured activities per week, 120 minutes of individual study per week, in total is 16 weeks per semester, including mid exam and final exam.
Credit points in Credit Units	3
Required and recommended prerequisites for joining the module	Students have learned some basic courses in statistics and statistical mathematics course. Students also have some knowledge on statistical software, such as R.
Module objectives/intended learning outcomes:	After completing this course the students have ability to: CO 1. analyzing various stochastic processes, allowing for a deeper understanding of randomness in dynamic systems. CO 2. Develop the ability to construct and analyze stochastic models, enabling the investigation of uncertainty and variability in real-world phenomena. CO 3. Attain autonomy in designing and conducting research projects utilizing stochastic processes, contributing to advancements in fields such as finance, engineering, and biology.
Content:	It will be derived from the research topic of the students. It will be focused on the theory, models, and method of specific data analysis used in the student research.
Examination forms	Oral presentation, essay, paper
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 (portfolio/essay/oral presentation) — 35% 2 — Mid-Term Examination (portfolio/essay/presentation) — 35% 3 — Class Activities: Presentation — 30% To pass the course, the minimum grade is B.
Media employed:	Board, LCD Projector, Laptop/Computer

Reading List:	1. Ross, S. M. (2014). Introduction to probability models (10th ed.). Academic Press. 2. Karlin, S., & Taylor, H. M. (2011). A first course in stochastic processes (2nd ed.). Academic Press. 3. Øksendal, B. (2003). Stochastic differential equations: An introduction with applications (6th ed.). Springer. 4. Cinlar, E. (2013). Introduction to stochastic processes (Dover Books on Mathematics). Dover Publications.

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	
CO 3	v	v	v		v	v

Last Modified Date : October 9, 2023