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MODULE HANDBOOK

Module Name	Topic on Finance and Actuarial Science A
Code, if applicable	**MMM 7422**
Subtitle, if applicable	
Semester(s) in which the module is taught	1st or 2nd semester
The person responsible for the module	Chair of Statistics Laboratory
Language	Bahasa Indonesia
Relation to curriculum	Elective course
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	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 Actuarial Model CO 2 master the Aggregate loss model CO 3 perform the Construction of the Empirical model CO 4 perform Credibility

Content	Characteristics of Actuarial Model, Aggregate loss model, Construction of Empirical model, Credibility
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	Klugman, S. A., Panjer H. H., and Willmot G. E., 2019, *Loss Models: From Data to Decisions, Fifth Edition*, John Wiley & Sons, Inc. .

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**
CO 4	**v**			**v**	**v**	**v**

Compilation Date : 2/1/2023

Modified Date : 1/2/2024

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MODULE HANDBOOK

Module name:	Topics in Financial Statistics and Actuarial Science A
Code, if applicable:	MMM-7422
Subtitle, if applicable	Analysis of Claims Reserves
Semester(s) in which the module is taught:	1st or 2nd Semester
Person responsible for the module:	Chair of The Study Program
Language:	Bahasa Indonesia
Relation to curriculum:	Compulsary Courses
Type of teaching, contact hours:	Lecture, project
Workload (incl. contact hours, self-study hours)	*The total workload is 232 hours per semester, which consists of 50 minutes of lectures per week, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid and final exams.*
Credit points:	3
Required and recommended prerequisites for joining the module	Before taking this course, the students must have a good understanding in actuarial risk theory
Module objectives/intended learning outcomes:	On satisfying the requirements of this course, students will have the knowledge and skills to: CO-1: Students will comprehend basic methods in claim reserving and will be able to evaluate: • the concepts of claim reserving • claim reserve using some basic methods, such as chain ladder and Bornhuetter–Ferguson. • a run-off triangle representation in incremental or cumulative form CO-2: Able to evaluate concepts associated with Bayesian method as well as their applications • the concepts of Bayesian method • claim reserve using some Bayesian methods, such as Benktander-Hovinen and Cape–Cod CO-3: Students analyse key concepts of special chain ladder method and their applications. • the concepts of special chain ladder methods such as Munich chain ladder • claim reserve using special chain ladder method
Content:	The purpose of this course is to develop knowledge of the methods in calculating claim reserve • Fundamental properties of the claims reserving process • Basic Methods: Chain-ladder, Bornhuetter–Ferguson method • Classical CL model • Benktander–Hovinen method and Cape–Cod model

Study and examination requirements and forms of examination:	The final mark will be weighted as follows: Weight (percentage) 1 Formulation the originality of research problem 25% 2 Formulation the theoritical framework 25% 3 Formulation the conjecture and metodhology 20% 4 Presentation 30% Minimum final mark to pass : B
Media employed:	White/Black Board, LCD Projector, Laptop/Computer
Reading List:	The related references to the dissertation will be nominated as per the selected topic and content. General references: 1. Wuthrich, M.V., Merz, M (2008) Stochastic Claims Reserving Methods in Insurance, John Wiley & Sons

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		v	v
CO 3	v	v	v		v	v

Modified Date : February 10th 2024

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MODULE HANDBOOK

Module Name	Topic on Finance and Actuarial Science A
Code, if applicable	MMM 7422
Subtitle, if applicable	Advanced Mathematics financial
Semester(s) in which the module is taught	3rd semester
The person responsible for the module	Chair of Statistics Laboratory
Language	Bahasa Indonesia
Relation to curriculum	Elective course
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	3
Required and recommended prerequisites for joining the module	Students have learned financial mathematics, numeric methods, optimization theory
Module objectives/intended learning outcomes	After completing this course, the students have ability to: CO1. analyze the use of financial mathematics related to the doctoral research being studied CO2. master annuity theory related to the doctoral research being studied CO3.combine financial mathematics and annuity theory related to the doctoral research being studied
Silabus	Preliminaries on Financial Markets The Time Value of Money Bond Valuation Portfolio Theory Markowitz Portfolio Theory Capital Market Theory and Portfolio Risk Measures Binomial Trees and Security Pricing Modeling Stochastic Calculus and Geometric Brownian Motion Model Derivatives: Forwards, Futures, Swaps, and Options The BSM Model and European Option Pricing, Simulation in Option Valuation
Examination forms	*oral presentation and essay.*

Study and examination requirements	The final mark will be weighted as follows: Weight(percentage) Final Examination (portfolio/essay/oral presentation) 60% Mid-Term Examination (portfolio/essay/presentation) 15% Class Activities: Presentation 25% To pass the course, the minimum grade is B.
Media employed	online platforms, Learning management systems, LCD projectors, and whiteboards.
Reading list	1. Kellison, S. G., 1991. *The Theory of Interest,* John Wiley & Sons. New York. 2. Yuh-Dauh Lyuu, 2004. *Financial Engineering and Computation*. Cambridge University Press, United Kingdom. 3. Sergio M. Focardi (Author), Frank J. Fabozzi (Author), 2004. The Mathematics of Financial Modeling and Investment Management 1st Edition, **Wiley.** 4. Arlie O. Petters , Xiaoying Dong, 2016. An Introduction to Mathematical Finance with Applications, Springer New York, NY

CO and PLO mapping

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

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MODULE HANDBOOK
Doctoral in Mathematics

Module name:	Topics in Financial Statistics and Actuarial Science A
Code, if applicable:	MMM-7422
Subtitle, if applicable	Advanced Actuarial Mathematics
Semester(s) in which the module is taught:	1st or 2nd Semester
Person responsible for the module:	Chair of Lab. Statistics
Language:	Bahasa Indonesia
Relation to curriculum:	Compulsary Courses
Type of teaching, contact hours:	Lecture, project
Workload (incl. contact hours, self-study hours)	*The total workload is 232 hours per semester, which consists of 50 minutes of lectures per week, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid and final exams.*
Credit points:	3
Required and recommended prerequisites for joining the module	Before taking this course, the students must have a good understanding in financial mathematics such as interest theory and annuities.
Module objectives/intended learning outcomes:	On satisfying the requirements of this course, students will have the knowledge and skills to: CO-1: Analyze theory of benefit reserves including: • the concepts of benefit reserve and their application in actuarial science • benefit reserve either in discrete form or in continuous • formulation of benefit reserve for various life insurance products CO-2: Able to analyze concepts associated with insurance model including expenses, as well as their applications: • the concepts of expenses in life insurance • gross premium for several insurance contracts CO-3: Evaluate and analyze concepts of multi life and multi decrement model, including: • the concepts of multi life and multi decrement model • some probabilistic quantities based on multi life and multi decrement model. • the principle of premium calculation such as equivalence or exponential premium.
Content:	The purpose of this course is to develop knowledge of the fundamental actuarial tools for quantitatively assessing risk. The application of these tools to problems encountered in actuarial science is emphasized. A thorough command of the supporting calculus is assumed. • Benefit Reserve • Insurance model including expenses • Multi life model • Multi decrement model

Study and examination requirements and forms of examination:	The final mark will be weighted as follows: Weight (percentage) 1 Formulation the originality of research problem 25% 2 Formulation the theoritical framework 25% 3 Formulation the conjecture and metodhology 20% 4 Presentation 30% Minimum final mark to pass : B
Media employed:	White/Black Board, LCD Projector, Laptop/Computer
Reading List:	The related references to the dissertation will be nominated as per the selected topic and content. General references: 1. Bower, et.al (1999) Actuarial Mathematics, Society of Actuaries, Schaumburg, Illinois 2. www.aktuaris.org 3. www.soa.org

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		v	v
CO 3	v	v	v		v	v

Compilation Date : 8/9/2022

Modified Date : 10/2/2024

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MODULE HANDBOOK

Module Name	Topic on Finance and actuarial science A
Code, if applicable	**MMM 7422**
Subtitle, if applicable	Financial Modelling
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, project.
Workload (incl. contact hours, self-study hours)	3 hours lectures, 6 hours individual study, 14 weeks per semester, and total 126 hours a semester
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 stock price model ● CO 2 Analyze European and American options ● CO 3 Master Valuation of European and American options ● CO 4 Develop option pricing
Content	Stock price model, European and American options, Valuation of European and American options, Application of option pricing
Examination forms	*oral presentation and essay.*
Study and examination requirements	The weight of assignments will be as follows: 1. Quiz, homework, presentation 30% 2. Mid-semester exam 35% 3. Final exam 35% Minimum final mark to pass : B
Media employed	online platforms, Learning management systems, LCD projectors, and whiteboards.
Reading list	1. Shreve, S. E., 2004, *Stochastics Calculus for Finance I*, Springer Verlag New York. LLC. 2. Shreve, S. E., 2004, *Stochastics Calculus for Finance II*, Springer Verlag New York. LLC. .

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 : 4/9/2023

Modified Date : 10/2/2024