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Graduate Program in Mathematics

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MODULE HANDBOOK

Module name:	Advance in Actuarial Mathematics (Matematika Aktuaria Lanjut)
Module level, if applicable:	Master Program
Code, if applicable:	MMM-5504
Semester(s) in which the module is taught:	First Year
Person responsible for the module:	Chair of The Study Program
Lecturer(s):	Dr. Adhitya Ronnie Effendie, M.Sc
Language:	Bahasa Indonesia
Relation to curriculum:	Master Degree in Mathematics, Compulsory Actuarial Interest Courses
Credit points:	3
Type of teaching, contact hours:	3x50 minutes lectures, 3x50 minutes structured activities.
Workload:	• 3x50 minutes lectures, • 3x50 minutes structured activities, • 3x50 minutes individual study, • In 16 weeks per semester (including mid-term and final examinations). • Total: 144x50 minutes per semester.
Requirements according to the examination regulations:	NONE
Recommended prerequisites:	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: Students will comprehend basic theory of benefit reserves and will be able to: • Explain the concepts of benefit reserve and their application in actuarial science • Calculate benefit reserve either in discrete form or in continuous • Define formulation of benefit reserve for various life insurance products CO-2: Students will understand main concepts associated with insurance model including expenses, as well as their applications • Explain the concepts of expenses in life insurance • Calculate gross premium for several insurance contracts • Define the difference between continuous and discrete insurance contracts CO-3: Students will understand key concepts of multi life and multi decrement model. • Explain the concepts of multi life and multi decrement model • Calculate some probabilistic quantities based on multi life and multi decrement model • Define 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: No Assessment methods (components, activities) 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% Final grade will be determined as follows: Grade Criteria A : $95 \leq$ final mark ≤ 100 A- : $90 \leq$ final mark < 95 A/B : $85 \leq$ final mark < 90 B+ : $78 \leq$ final mark < 85 B : $70 \leq$ final mark < 78 B- : $65 \leq$ final mark < 70 B/C : $60 \leq$ final mark < 65 C+ : $54 \leq$ final mark < 60 C : $48 \leq$ final mark < 54 C- : $40 \leq$ final mark < 48 C/D : $35 \leq$ final mark < 40 D+ : $30 \leq$ final mark < 35 D : $25 \leq$ final mark < 30 E : final mark < 25
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 S2 Mat	PLO – 2 S2 Mat	PLO – 3 S2 Mat	PLO – 4 S2 Mat	PLO – 5 S2 Mat	PLO –6 S2 Mat
CO 1	√	√	√		√	√
CO 2	√	√	√		√	√
CO 3	√	√	√		√	√

Programme Learning Outcomes (PLO) Magister 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.

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