Module Description/Course Syllabi

Study Programme: Bachelor of Mathematics
Faculty of Mathematics and Natural Sciences
Universitas Andalas

1. *Course number and name*

MAT62245 Actuarial Science

2. *Credits and contact hours/Number of ECTS credits allocated*

3 SKS / 4,53 ECTS

3. *Instructors and course coordinator*

1. Mawanda Almuhayar, M.Sc
2. Efendi, M.Si

4. *Textbook, title, author, and year*

1. A. R. Effendie, *Matematika Aktuaria*, 3rd ed. Tangerang Selatan: Penerbit Universitas Terbuka, 2023.
2. N. L. Bowers, Jr. *et al.*, *Actuarial Mathematics*, 2nd ed. Schaumburg, Illinois: Society of Actuaries, 1997.

5. *Recommended reading and other learning resources/tools*

3. A. R. Effendie, *Matematika Aktuaria dengan Software R*. Yogyakarta: Gadjah Mada University Press, 2018.

6. *Specific course information*

A. Brief description of the content of the course (catalog description)

In this course, students will learn about actuarial concepts, especially life insurance, which are developed from probability theory, interest theory, annuities, survival models, and mortality tables. The life insurance model

developed is an insurance model that is paid instantly at the time of death and insurance that is paid at the end of the year of death along with the calculation of full continuous and discrete life insurance premiums. This insurance model and premium calculation is studied on a case basis by life insurance companies and can be applied in everyday life.
B. Prerequisites or co-requisites
1. MAT62151 Mathematical Statistics 1 2. MAT61242 Introduction to Financial Mathematics
C. Indicate whether a required or elective course in the program
Elective course
D. Level of course unit (according to EQF: first cycle Bachelor, second cycle Master)
First cycle Bachelor
E. Year of study when the course unit is delivered (if applicable)
3rd year
F. Semester when the course unit is delivered
6th semester or even semester
G. Mode of delivery (face-to-face, distance learning)
Face-to-face learning
7. *Intended Learning Outcomes*
ILO-4: An ability to use concepts and fundamental techniques of mathematics in solving simple mathematical problems.

ILO-5: An ability to formally and correctly prove a simple mathematical statement using facts and methods that have been studied.
ILO-6: Have ability data literacy and technology and can apply them in solving simple mathematical problems or other relevant fields.
ILO 7: An ability to communicate effectively especially in the area of mathematics in with diverse communities.
8. ***Course Learning Outcomes***
An ability to explain actuarial concepts and probabilities in everyday life. (ILO-4)
An ability to calculate interest and fixed annuities based on events in everyday life. (ILO-4, ILO-5)
An ability to create survival models and mortality tables based on events in everyday life. (ILO-4, ILO-5, ILO-6)
An ability to calculate life annuities based on events in everyday life. (ILO-4, ILO-5)
An ability to calculate and simulate life insurance models and life insurance premiums based on events in everyday life. (ILO-4, ILO-5, ILO-6, ILO-7)
9. ***Brief list of topics to be covered***
1. Introduction to Actuarial Science and Review of Probability Theory. 2. Interest Theory: Understanding Interest, Nominal Compound Interest, and Continuous Compounding. 3. Definite Annuities: Simple Annuities, Initial Annuities, Deferred Annuities, and Continuous Annuities. 4. Survival Model: Survival Distribution, Death Rate, and Complete Life Expectancy. 5. Mortality Table: The Relationship of the Survival Function to the Mortality Table, Selection Table, Ultima Table, and Mortal Law. 6. Life Annuities: Continuous Life Annuities, Discrete Life Annuities, and *m*-times Life Annuities. 7. Life Insurance: Insurance Paid Instantly at Death and Insurance Paid at the End of the Year of Death.

8. Life Insurance Premiums: Full Continuous Model Premiums and Full Discrete Model Premiums.
10. ***Learning and teaching methods***
Directed Learning, Teacher-Centered Learning, Case-Based Learning
11. ***Language of instruction***
Bahasa Indonesia and English
12. ***Assessment methods and criteria***
Summative Assessment : 1. Assignment: 20% 2. Midterm exam: 25% 3. Final exam / final project: 55%