Module Description/Course Syllabi

Study Programme : Magister of Mathematics
Faculty of Mathematics and Natural Sciences.
Universitas Andalas

1. *Course number and name*

MAT81131 Probability Theory

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

3 / 4,50 ECTS

3. *Instructors and course coordinator*

1. Dr. Dodi Devianto, M.Sc; 2. Dr. Maiyastri, M.Si

4. *Text book, title, outhor, and year*

1. Howard G. Tucker. A Graduate Course in Probability. Academic Press, New York, 2014.
2. Kai Lai Chung. A Course in Probability Theory. Academic Press, San Diego, 2014.

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

3. Bert E. Fristedt and Lawrence F. Gray. A Modern Approach to Probability Theory. Springer, New York. 1997.
4. William Feller. An Introduction to Probability Theory and Its Aplication. Jhon Willey and Son, Canada. 2008.
5. Allan Gut. Probability: A Graduate Course. Springer, New York, 2012.
6. Eugene Lukacs. Characteristic Functions. Hafner Publishing Company. 1970.

6. *Specific course information*

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

In this course material is given about sigma fields, sigma borel fields, probability spaces, random variables, probability distributions and their properties, special random variables and their properties, convergence, law of large numbers, transformation and convolution, characteristic functions, infinitely divisible distributions, stable distribution, and some application of infinitely divisible distribution and stable distribution.

B. Prerequisites or co-requisites

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C. Indicate whether a required or elective course in the program

Required

D. Level of course unit (according to EQF: first cycle Bachelor, second cycle Master)

Second Cycle master

E. Year of study when the course unit is delivered (if applicable)
1st Year
F. Semester when the course unit is delivered
First Semester
G. Mode of delivery (face-to-face, distance learning)
Mixture (Face to face and Distance learning)
7. *Intended Leening Outcomes*
ILO-2: Mastering mathematical concepts and applications (real analysis, advanced linear algebra, and statistics) in solving complex mathematical problems. PI-1: Able to explain mathematical concepts (Real Analysis, Advanced Linear Algebra, and Statistics). PI-2: Able to identify complex mathematical problems. ILO-3: Able to master one or several mathematical problems in analysis, algebra, applied mathematics, statistics and combinatorics. PI-1: Able to identify theories used in related mathematical problems. PI-2: Able to apply theories for advancement in related fields (advanced theory). PI-3: Able to use advanced theory to solve related mathematical problems. ILO-4: Mastering scientific techniques and developing them in solving research problems through multidisciplinary or interdisciplinary approaches. PI-1: Able to apply mathematical techniques in research problem-solving. PI-2: Able to analyse research problems. PI-3: Able to formulate theorems/models and prove their validity. PI-4: Able to use various mathematical software to solve complex mathematical problems.
8. *Course Learning Outcomes* *ex. The student will be able to explain the significance of current research about a particular topic.*
1. Students will be able to explain the concept of probability theory including definition and its properties. 2. Students will be able to use the concept of probability theory and its properties and developing them as the basic tools in solving related research problem. 3. Students will be able to construct, modify, analyze/think in a structured manner on mathematical problems of a phenomenon in probability theory, and interpret and communicate orally or in writing, systematic and rigorous.
9. *Brief list of topics to be covered*
Measure theory, probability space, random variables and distribution functions, expected Value, variance and moment generating function, conditional probability and conditional expectations, special distribution and their properties, convergence, the law of large numbers, transformation and convolution, characteristics function, infinitely divisible distribution, stable distributions.
10. Learning and teaching methods

Presentation, Small Group Discussion, Directed Learning.
11. Language of instruction
Bahasa Indonesia
12. Assessment methods and criteria
Summative Assessment : 1. Tasks and Quiz : 20% 2. Project : 20% 3. Presentation : 20 % 4. Mid Semester : 20% 5. Final Semester : 20% **Formative Assessment**: 1. Thumb up and thumb down 2. Minutes paper