Module Description/Course Syllabi

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

1. *Course number and name*

MAT82234 Topic in Statistics 1

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

3 / 4,50 ECTS

3. *Instructors and course coordinator*

1. Prof. Dr. Ferra Yanuar, M.Sc
2. Dr. Dodi Devianto

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

a. Bain, L.J and Engelhardt, M. 1992. *Introduction to Probability and Mathematical Statistics,* second Edition. Duxbury Press, California.
b. Bolstad, William M. 2007. *Introduction to Bayesian Statistics*, second Edition. John Wiley & Sons, New Jersey.

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

Ntzoufras, I. 2009. Bayesian Modeling Using WinBUGS. John Wiley & Sons, Inc: Ney Jersey

6. *Specific course information*

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

In this course, material is provided on basic concepts in Bayesian inference. Bayesian inference on several distributions of discrete and continuous random variables. To increase understanding and provide simple research experience to students, this lecture is also equipped with an assignment, namely criticizing articles written related to Bayesian methods and presenting them individually.

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
Second 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. ILO-5: Able to work and conduct research in mathematics and related fields of science by developing the latest issues independently or collaboratively and communicating them academically. PI-1. Capable of formally and correctly proving mathematical statements. PI-2. Able to employ relevant techniques for conducting research. PI-3. Capable of communicating research findings academically.
8. *Course Learning Outcomes* *ex. The student will be able to explain the significance of current research about a particular topic.*
1. Students are able to explain basic concepts in statistics and modeling in statistics. 2. Students are able to explain the concept of Bayesian analysis and use Bayesian inference on data distribution (discrete and continuous). 3. Students are able to use hybridization of the Bayesian method with several other statistical methods. 4. Students are able to construct simple algorithms for modeling using Bayesian methods. 5. Students are able to use software and create algorithms to apply Bayesian and hybridization methods. 6. Students are able to reason intuitively and analytically and are able to express the results of their reasoning in writing, systematically and rigorously, both individually and in groups.

9. *Brief list of topics to be covered*

1. Parameter estimation and hypothesis testing.
2. Basic concepts in Bayesian analysis.
3. Bayesian inference on the distribution of discrete random variables.
4. Bayesian inference on the distribution of continuous random variables.
5. Basic concepts for using the R application and/or WinBugs in Bayesian analysis
6. Reviewing articles related to Bayesian methods.

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. Assignment : 30%
2. Activeness : 10%
3. Midterm exam : 30%
4. Final exam : 30%

Formative Assessment:

1. Thumb up and thumb down
2. Minutes paper