	# Module Description/Course Syllabi Study Programme: Bachelor of Mathematics Faculty of Mathematics and Natural Sciences Universitas Andalas

1. *Course number and name*

MAT62232 Combinatorics

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

3 SKS / 4.52 ECTS

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3. *Instructors and course coordinator*

1. Dr. Lyra Yulianti, 2) Dr. Des Welyyanti, 3) Narwen, M.Si

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

Bryant, V., *Aspect of Combinatorics: A Wide-ranging introduction*, Cambridge Univ. Press, Great Britain, 1995

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

K.H. Rosen, Discrete Mathematics and Applications, McGraw-Hill, New York, 7th Edition, 2012
Erickson, M. *Pearls of Discrete Mathematics*, CRC Press, Taylor, and Francis Group, 2010

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6. *Specific course information*

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

This course gives some concepts in Combinatorics: Binomial and Multinomial Coefficients, Three basic principles in Combinatorics, Latin Square, Review of Recurrence Relation, Marriage Theorem, Trees, Euler and Hamiltonian Theorem, and Coloring in graphs.

B. Prerequisites or co-requisites

MAT61111 Introduction to Mathematics, MAT62131 Discrete Mathematics
C. Indicate whether a required or elective course in the program
Elective
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)
2st Year
F. Semester when the course unit is delivered
Even Semester
G. Mode of delivery (face-to-face, distance learning)
Face to face

7. Intended Learning Outcomes
ILO-2: Possesses profound knowledge of the basic concept mathematics PI-1: An ability to explain basic mathematical concepts PI-2: An ability to provide examples that are relevant to basic mathematical concepts PI-3: An ability to determine solutions to simple problems using basic mathematical concepts
ILO-3: An ability to identify, explain and generalize simple mathematical PI-1: An ability to identify simple mathematical problems PI-2: An ability to explain simple mathematical problems PI-3: An ability to generalize simple mathematical problems

ILO-4: An ability to use concept and fundamental technique of mathematics in solving simple mathematical problems

PI-1: An ability to illustrate simple mathematical problems based on appropriate basic mathematical concepts and techniques

PI-2: An ability to illustrate simple mathematical problems based on appropriate basic mathematical concepts and techniques

PI-3: An ability to solve simple mathematical problems using the proper concept and mathematical fundamental techniques

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ILO-5: An ability formally and correctly proves a simple mathematical statement using facts and methods that have been studied.

PI-1: An ability to identify formal structures and analogous forms in mathematics

PI-2: An ability to use facts and apply methods to prove simple mathematical statements

PI-3: An ability to present simple mathematical statement proof rigorously (sequentially and conscientious)

PI-4: An ability to conclude or interpret result of the proving simple mathematical statement

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ILO-6: Have ability data literacy and technology and can apply them in solving simple mathematical problems or other relevant fields

PI-1: Able to identify the right data and technology to solve simple mathematical problems or other fields

PI-2: Able to use data and technology and apply them to solve simple mathematical statements or other areas

PI-3: Able to process data using available technology in simple mathematical problems or other fields

PI-4: Able to conclude and interpret data processing results for simple mathematical problems or other fields

PI-5: Able to design an algorithm to solve simple mathematical problems or other fields

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8. *Course Learning Outcomes*

Have the understanding about the binomial and multinomial coefficients and their properties

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Have the understanding about three basic concepts in Combinatorics: Pigeonhole Principle, Parity, and Inclusion-Exclusion Principle.

Have the understanding about Latin Square and its properties

Have the understanding about Recurrence Relation and its properties

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Have the understanding about Marriage Theorem and its connection to matching and tournament

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Have the understanding trees and their properties

Have the understanding about *Eulerian circuit* and *Hamiltonian cycle* in a graph.
Have the understanding about vertex coloring, edge coloring, and map coloring in a graph, and determine the vertex-chromatic and edge-chromatic numbers of a graph.

9. *Brief list of topics to be covered*
1. Binomial and Multinomial Coefficients 2. Three Basic Concepts in Combinatorics 3. Latin Square 4. Recurrence Relation 5. Marriage Theorem 6. Trees 7. Eulerian Circuit and Hamiltonian Cycle 8. Coloring in Graphs: Vertex, edge and map colorings

10. Learning and teaching methods
Project-Based Learning, Student Centre Learning

11. Language of instruction
Bahasa

12. Assessment methods and criteria
Summative Assessment: 1. Mid-term exam: 30% 2. Final exam: 30% 3. Quiz: 20% 4. Task: 20%