PROGRAM STUDI MATEMATIKA
DEPARTEMEN PENDIDIKAN MATEMATIKA
FAKULTAS PENDIDIKAN MATEMATIKA DAN ILMU PENGETAHUAN ALAM
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Jl. Dr. Setiabudhi 229, Bandung 40154, Telp/Faks. (022) 2004508

COURSE DESCRIPTION IN MATHEMATICS STUDY PROGRAM CURRICULUM 2018

NO	CODE	COURSES NAME	SKS	SEMESTER	PREREQUISITE COURSES	COURSE DESCRIPTION
1	MT300	Basic Mathematics	3	1	-	This course is intended so that students have mastery of basic mathematical concepts that will be used in advanced mathematical concepts and can reason logically as a provision in proving mathematical concepts deductively. Lecture materials include understanding statements, arguments, confirming the validity of arguments, quantification, syllogisms, logical algebra, applications logic in mathematics and everyday life, understanding of sets, membership of sets, diagrams of sets, types of special sets, relations between sets, operations on sets, knowledge of relations, types of relations, understanding of functions, types of functions, operations in the form of functions, as well as the application of the concept of sets in everyday life.
2	MT301	Differential Calculus	3	1	-	In this course, students will study and examine the concepts of Real number system; Function, function limit, and function continuity; definitions, properties and formulas - derivative formulas and their applications; definition and properties of transcendent functions and their applications; definitions, properties, formulas of

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						indefinite integrals and definite integrals are seen as anti-derivatives
3	MT303	English for Mathematics	2	1	-	This course provides a good understanding of English vocabulary in Mathematics. After completing this course, students are expected to gain knowledge about English words in the world of Mathematics. This course teaches several topics, namely Algebra, Statistics, Calculus, and Number Theory in English. In this course, the methods used in learning are lectures, then presentations to apply the theories that have been given
4	MT305	Number Theory	2	2	Basic Mathematics	This course is intended to provide students with the ability to prove beginners to learn mathematical proofs. The material in this course is full of evidence. The proof strategy is developed in understanding a number theory concept. The ability to prove in this course is expected to bridge students' understanding in learning more abstract mathematical concepts at the next level. The topics discussed in this lecture include Mathematical Proofs, Division Algorithms, Greatest Common Divisors, Euclid's Algorithm, Least Common Multiples, Diophantine Equations, and Basic Properties Congruence, Division Test, Linear Congruence, Linear Congruence System,

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						understanding prime numbers and composite numbers, and primality test.
5	MT308	Basic Statistics	3	1	-	In this course, students will study and examine: basic statistical concepts regarding the meaning, nature, and application of: statistics, population, samples, data presentation techniques, various sizes, various uses of statistical tables, sampling distributions, parameter estimation, hypothesis testing, regression and correlation analysis.
6	MT307	Integral Calculus	3	2	Differential Calculus	In this course, students will study in-depth the concepts of integration with substitution, partial integration, integration of several trigonometric functions, integration with trigonometric substitution, and integration of rational functions; The area of the flat plane, and the volume of the solid object using the method of parallel slices; The volume of the rotating object using the disc method, the volume of the rotating object using the ring method, the volume of the rotating object using the tube shell method, the length of the curve, and the surface area of the rotating object; Center of mass of a plate, centroid, and Pappus' theorem; Indeterminate forms of the type 0/0 and /∞, L'hopital's theorem, and other indefinite forms Improper integrals and their properties; Infinite sequences and series, positive series: Integral and

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						other tests, Power series and their operations, and Talor and Maclaurin series.
7	MT309	Discrete Mathematics	3	2	Basic Mathematics	This course is intended to provide students with an understanding of patterns, structures, and regularities in mathematical concepts through graph theory, relations, and finite state machines.
8	MT311	Linear Algebra	4	2	Basic Mathematics	This course contains the basic knowledge of linear algebra covering topics of matrix operations, determinants, vector spaces, inner product spaces (finite dimension), linear mapping and matrix diagonalization. The lecture method used is expository, lecture, discussion, question and answer and problem solving.
9	MT313	Algorithm and Programming	2	3	-	This course is intended to provide basic knowledge of algorithms and computer programming. The materials discussed in this lecture are 1) basic concepts of algorithms and flares, the basic structure of algorithms, algorithmic notation; 2) data types, operators and expressions, sequences; 3) selection of one case, two cases, and more than two cases; 4) FOR repetition, WHILE repetition, REPEAT-UNTIL repetition, and their application in mathematics. The lecture method used is expository and is accompanied by practicum

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10	MT314	Data Processing	3	4	Basic Statistics	In this course, students will identify and discuss knowledge about 1) types of data, data collection instruments/tools, data presentation; 2) descriptive data analysis techniques, inferential data analysis techniques; 3) as well as several data processing software such as MS-Excel; SPSS, and Minitab. The software is used in processing data and interpreting the results of processing the data
11	MT316	Geometry	3	3	Basic Mathematics	This course is given to students so that students can have basic knowledge, understanding, and abilities in geometry and can solve relevant problems in geometry. In addition, practically, students are expected to use some mathematical software appropriate to geometry, such as GeoGebra. Students will study and examine concepts in this course: basics of axiomatic systems in mathematics and geometry, introduction to Euclidean geometry, and introduction to non-Euclidean geometry. Euclid's geometry was studied to cover the following topics: parallelism of lines, triangles and quadrilaterals, area of planes, congruence and similarity of triangles, Menelaus and Ceva's theorems, Varignon's theorems, and circles. Introduction to non-Euclidean geometries covered includes finite geometry, neutral geometry, hyperbolic geometry, and elliptic geometry.

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12	MT315	Multivariable Calculus	3	3	Differential Calculus and Integral Calculus	The Multivariable Calculus course is an intermediate-level course in the undergraduate program (S-1) in the field of Mathematics and Mathematics Education. It is a continuation of differential calculus and integral calculus lectures. It is also one of the basic materials for studies in vector calculus courses and other analytical subject group studies. The study in the Multivariable Calculus lecture takes the form of discussions and discussions about the multivariable function which is an extension of the one-variable function, analogizes the concepts of limit, continuity, differential and integral functions of one variable to obtain a generalization of the concept of the limit of a multivariable function, develops and generalizes various limit theorems, continuous, differential and integral functions of one variable into the form of many variable functions, applying various limit theorems, continuity, differential and integral functions of many variables.
13	MT317	Linear Programming	3	3	Linier Algebra	This course can help solve problems regarding optimization in the fields of economy, industry, agriculture, and many other areas. In this course, students will learn about linear programming modeling, the simplex method, the revised simplex method, sensitivity analysis (post-optimal analysis, duality, and their application in helping to solve

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						optimization problems in economics, industry, agriculture, and other fields.) The mathematics of this course is a prerequisite for the Operations Research course.
14	MT400	Group Theory	3	3	Basic Mathematics, Number Theory	This course is intended to have the knowledge, understanding, and ability to identify and construct proof of an argument or group theory concept. By studying this course, students are expected to reason logically and systematically and analyze the validity of an argument. In this course, students will research and examine 1) mapping and its types; 2) various functions; 3) groups and properties of groups, subgroups, cyclical groups, permutation and symmetry groups; 4) group homomorphism and isomorphism; 5) equivalence relations, cosets, and Langrange's theorem; 6) normal subgroups and factor groups, the fundamental theorem of homomorphism, and group automorphism, and their use to solve problems.
15	MT402	Ordinary Differential Equations	3	3	Basic Mathematics, Differential Calculus and Integral Calculus	This course discusses differential equations (PD), orders, degrees, linear, nonlinear PD, homogeneous and nonhomogeneous PD. Then it is introduced how to find a first-order linear PD solution for the model: separate variables, homogeneous PD, exact PD, linear PD, and

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						Bernoulli PD, as well as finding a solution of a PD using simple substitution methods and integration factors. Furthermore, it is introduced to explain second-order homogeneous linear PD with constant coefficients, second-order nonhomogeneous linear PD using the indeterminate coefficient method and the parameter variation method, and how to find a PD solution using the Laplace transform. In addition, it is also introduced how to find a PD solution using the power series method and using the matrix
16	MT403	Real Analysis	3	4	Differential Calculus and Integral Calculus	This course outlines an in-depth study of real numbers both in terms of structure (operations), related theorems, and concepts related to real numbers. In this course, students will study and study in-depth the algebraic properties of real numbers, the nature of sequences in R, absolute values, completeness in R, supremum applications, Intervals, finite sets, Countable sets, real numbers sequences, and their limits. Monotonous sequences, subsequences and the Bolzano-Weierstrass theorem, Cauchy sequences, and properties of divergent sequences, Infinite Series.
17	MT404	Theoretical Descriptive Statistics	3	3	Differential Calculus	This course is intended to give students the ability to theoretically understand the concepts of descriptive statistics so that they can solve

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						problems in descriptive statistics theoretically. Lecture materials include Numbering techniques, Probability calculation, distribution of one random variable, distribution of two random variables, Expectation of one random variable, Expectation of two random variables, Some special discrete distributions, Some continuous special distributions, Some distribution techniques of random variable functions, Application of distribution techniques random variable function.
18	MT405	Modular Programming	2	4	Algorithm and Programming	This course is intended for students to have the ability to make computer programs in a modular manner. The material discussed in this lecture is modular procedures and functions, parameterized modular arrays, matrices, search algorithms, sorting algorithms, and recursive algorithms. The lecture method used is expository and accompanied by a practicum
19	MT407	Ring Theory	3	4	Group Theory	This course is intended to know and understand abstract ideas and critical ideas contained in algebraic structures such as definitions, theorems, lemmas, and corollaries, along with their proofs. The topics discussed in this course are Introduction to Rings, Integral Regions, Ideals and Factor Rings, Ring Homomorphisms and Polynomial Rings

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20	MT408	Numerical Analysis	3	5	Basic Mathematics, Differential Calculus, Integral Calculus, Linear Algebra, Algorithm and Programming, and Ordinary Differential Equations	In this course, students will learn and examine the basic concepts in Numerical Analysis. Covers error, interpolation, approximation of functions with series, approximation of functions with the least squares method, systems of linear equations, numerical integration and differential equations. In this course, the methods used in calculations will be discussed based on the theorems or lemmas that underlie each method. Each topic begins with the underlying theory, the algorithm of each method used, equipped with examples of calculations both manually and computationally. Calculations with computers are assigned and made by students with the help of Delphi software. While the preliminary analysis, especially the analysis of the function graph, can use the Maple program. After completing this course, students are expected to gain an appreciation of the concept of error and the need to analyze and estimate it, and can develop experience in using computers to solve problems in numerical analysis.
21	MT409	Theoretical Inferential Statistics	3	4	Theoretical Descriptive Statistics	This course is mandatory for students of the Mathematics Study Program of the Department of Mathematics Education. It is one of the Study Program Core Expertise Courses (MKKIPS), which is included in the Study Program Expertise Course Group (MKKPS). The materials discussed

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						are 1) Sequence Statistics (Some Probability Density Functions, Some Mathematical Expectations, Some Distributions of Sequence Statistical Functions); 2) Distribution of Approaches (Technical Moment Generating Function, Central Limit Theorem, Stochastic Convergence); 3) Parameter Estimation (Types of Estimates; Estimator Properties: Unbiased, Minimum Variance, Consistent, Sufficient Statistics; 4) Exponential Family; 5) Point Estimator Determination Method: Moment Method, Maximum Likelihood Method, Bayesian Estimator); 6) Interval Estimate (Interval Estimate: Mean, Variance, Proportion, Difference of Two Means, Difference of Two Proportions, In General); 7) Hypothesis Testing (Multiple Terms, Best Critical Area, Uniform Most Powerful Test, Probability Comparison Test).
22	MT410	Differential Real Functions Theory	3	5	Real Analysis	This course outlines an in-depth study of limits, continuity, function derivatives both in terms of structure (operations), related theorems, and concepts related to functions (operators). In this course, students will study and examine in depth the definition of limits, continuity, derivatives of functions, definitions, and theorems and apply them in solving problems.

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23	MT411	Operations Research	3	5	Linear Programming	This course is intended to give students the ability to analyze optimization problems, model these problems, and solve them using appropriate operations research techniques. In this course, students will study and examine: transportation models, transshipment models, Assignment models, and methods of solving the Integer Programming model.
24	MT412	Mathematics Computer Application Program	3	6	Basic Mathematics, Differential Calculus, Integral Calculus, Linear Algebra, Algorithm and Programming, and Modular Programming	After taking this course, students have knowledge, understanding, and skills regarding the application of various software, including Maple, SPSS, Minitab, MATLAB, and R, in expressing different mathematical concepts (Statistics, Analysis, Algebra, and Applied) as well as the processing and presenting data in Statistics. This course studies mathematical topics (Statistics, Analysis, Algebra, and Applied) regarding functions and graphs of functions, both one variable and two variables; limits and derivatives of either one or two variables; integral and its application; vectors and operations on vectors; matrices and operations on matrices; system of linear equations; eigenvalues and eigenvectors; descriptive statistics; inference statistics; non-parametric statistics; algorithm; programming with Matlab and R software.

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25	MT415	Vector Calculus	3	5	Differential Calculus, Integral Calculus	The Vector Calculus course material is a continuation of the Multivariable Calculus course with a core discussion of vector-valued vector functions. Students are expected to understand and enjoy a series of calculus from real function calculus to vector function calculus with vector values as a unified whole. During one semester, students receive learning services from lecturers. The scope of the material; Vector functions and parameter equations; Limits and continuity of vector functions; Derivatives and integrals of vector functions; arc length ; Unit tangent vector, unit normal vector; Curvature; Movement in the field; vector field; line integral; The line integral is independent of the path; Green's theorem; surface integrals, Gaussian divergence theory and Stoke's theorem.
26	MT416	Combinatorical Mathematics	3	4	-	This course is intended to give students the ability to understand the fundamental theories of combinatorics and use them in solving counting problems. Furthermore, this course also develops combinatorial thinking and combinatorial analysis skills for students. In this course, students will study and examine: Basic rules of calculation, inclusion-exclusion principles, pigeon nest

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						principles, binomial coefficients, recursion equations, and generating functions.
27	MT417	Transformation Geometry	3	5	Differential Calculus, Integral Calculus, Geometry, Group Theory	This course is given to have basic knowledge, understanding, and ability in Transformation Geometry and solve problems in the relevant geometry field. In addition, practically, students are expected to use some mathematical software pertinent to Transformation Geometry, such as GeoGebra. Students will learn and examine the concepts of Definition of Transformation, Reflection (Reflection), Isometry, Transformation Composition, Inverse Transformation, Translation, Half Rotation, Rotation, and Shear Reflection.
28	MT418	Functions of Complex Variables	3	7	Differential Calculus, Integral Calculus, Real Analysis, Introduction to Topology	This course examines in-depth the concepts of complex numbers, complex functions, elementary transformations, basic topological concepts in complex fields, limits and continuity of complex functions, derivatives of complex functions, analytical functions, and complex integration. The topics studied include complex number systems, complex number geometry, roots of complex numbers, complex functions, elementary functions, linear transformations, inverse transformations, bilinear transformations, basic concepts in topology in complex fields, limits of complex functions, continuity of complex functions,

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						derivatives complex functions, Cauchy Reimann equations, analytical functions, complex integrations, Cauchy integrations, and Annulus.
29	MT419	Introduction to Topology	3	5	Differential Calculus, Integral Calculus, Real Analysis, and Differential Real Functions Theory	This course discusses: open and closed sets; characteristics of open and closed sets, as well as Cantor sets; compact sets and the Heine Borel theorem; function continuity and function continuity at one point; preservation of the compactness of an assemblage; metric and semi-metric spaces; topology space; base and sub-base; and mapping in the topological space
30	MT426	Selected Topics in Mathematics (Statistics)	4	7/8	Theoretical Inferential Statistics	This course is given to writing a paper or scientific work on mathematical material (especially Statistics) worthy of being presented in the form of a seminar. This choice of mathematical material can be developed to be used as thesis material. Materials that are eligible to be selected must meet specific criteria, namely following the field of Statistics and meet at least one of 1) actual (new) mathematical problems; 2) expansion/deepening/enrichment of mathematics material in the applicable S1 Mathematics Study Program curriculum; or 3) applied about a mathematical concept, especially Statistics.

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31	MT425	Partial Differential Equations	3	4	Differential Calculus, Integral Calculus, and Ordinary Differential Equations	This course discusses the meaning of partial differential equations (PDP), order, degree, linear, nonlinear PDP, homogeneous and nonhomogeneous PDP. Then introduced the types of second-order PDP and how to find the solution and continued by discussing the diffusion/heat equation, the wave equation, and the Poisson equation. Furthermore, the problem of the diffusion equation's initial values and boundary conditions and the wave equation with Dirichlet limit and Neumann limit is discussed. In addition, the Fourier sine, cosine, and mixed series are also discussed, as well as their application to the diffusion equation and wave equation, followed by drawing a graph of the solution using Matlab software.
32	MT426	Selected Topics in Mathematics (Analysis)	3	7/8	Real Analysis real, Differential Real Functions Theory	This course outlines an in-depth study of essential material (not in the lecture) or selected material (by students) taken in source books or journals. In this course, students will study and study in-depth about the concepts of essential material or selected material taken from the Journal to be used as reference material or continued for final project material.

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33	MT426	Selected Topics in Mathematics (Applied)	3	7/8	Ordinary Differential Equations, Partial Differential Equations	In this course, students are given experience in making research designs, starting from the experience of reviewing a scientific article, tracking related studies, formulating a problem formulation, doing a literature review and theoretical basis, designing research methodology and initial discussion, then communicating it in oral and written form.
34	MT426	Selected Topics in Mathematics (Algebra)	3	7/8	Operator Algebra	Capita Selecta Mathematics is a compulsory subject for students at KBK Algebra. In this course, students will be invited to understand compiling scientific papers based on algebra articles published in international journals. This process includes: how to understand the essence of scientific work, the experience of reading algebra articles that have been published in international journals, how to use basic techniques for selecting topics for scientific research, how to compile reports.
35	MT522	Mathematical Modeling	3	6	Ordinary Differential Equations	This course is intended to provide knowledge about the steps of mathematical modeling and experience in compiling mathematical models. Mathematical modeling is related to discrete and continuous change problems, parameter estimation, decision theory, game theory, size problems, and dimensional analysis.

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36	MT424	Graph Algebra	3	6	Discrete Mathematics	This course is intended to give students the ability to understand the basic concepts of graph theory. The scope of the material includes 1) roads, trails, trajectories, and cycles; 2) characteristics of special graphs; 3) basic concepts of trees and their properties; 4) properties of Euler and Hamilton graphs; 5) plot; 6) connectedness; 7) the concept of vertex coloring and side coloring; 8) basic concepts of matching and covering; 9) the basic concept of factorization; 10) networks and flows.
37	MT505	Sampling Theory	3	6	Theoretical Descriptive Statistics, Theoretical Inferential Statistics	The materials discussed in this lecture are: Class Rules; Statistics Basics: Population, Sample, Data Collection Method, Data Presentation Method (Box Plot), Rounding Numbers, Central Symptom Size, Interval Assessment; The Concept of Opportunity Distribution, Distribution Functions, Expectations and Variances, Properties of Expectations and Variances, Expectations and Variances of Linear Combinations of Random Variables, Covariance, Correlation, Coefficient of Variation; Parameter Assessment: Estimator Properties (Irregular, Minimum Variance, Efficient); Simple Random Sampling: Introduction, Simple Random Sampling, Estimating Population Mean and Total, Determining Sample Size to Estimate Population Means and Total, Estimating Population

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						Proportion, Comparing Estimates; Stratified Random Sampling: Introduction, Stratified Random Sampling, Estimation of Mean and Total Population, Determination of Sample Size for Estimating Mean and Total Population, Allocation of Samples, Assessment of Population Proportion, Determination of Sample Size and Allocation of Samples to Estimate Proportions, Rules Allocation for Selecting Strata, Stratification after Determination of Double Sampling for Stratification; Ratio, Regression, and Difference Assessment: Introduction, Surveys That Require the Use of the Ratio Estimator, Determination of Sample Size, Ratio Estimation in Stratified Random Sampling, Estimating Regression, Assessment of Differences, Relative Efficiency of Estimators; Mid Semester Exam (UTS); Systematic Sampling: Introduction, Systematic Sampling, Assessment of Population Mean and Total, Estimating Population Proportion, Determining Sample Size, Repetition of Systematic Sampling, Further Discussion of Variance Estimators; Simple Cluster Sampling: Introduction, Simple Cluster Sampling, Population Mean and Total Estimation, Same Cluster Size: Simple Random Sampling Comparison, Determination of Sample Size for Estimating Mean

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						and Total Population, Estimating Population Proportion, Determining Sample Size for Assessment Proportion, Combined Cluster Sampling with Stratification, Cluster Sampling with Proportional Opportunity Size (Probabilities Proportional to Size = PPs); Two-Stage Cluster Sampling: Introduction, Two-Stage Cluster Sampling, Bias Estimation of Mean and Total Population, Ratio Estimation of Population Means, Assessment of Population Proportion, Same-Size Cluster Sampling, Two-Stage Cluster Sampling with Size Proportional Opportunities (Probabilities Proportional to Size = PPs); Population Size Estimation: Introduction, Assessment of Population Size by Direct Sampling, Estimating Population Size with Inverse Sampling, Determining Sample Size for Direct and Inverse Sampling, Estimating Population Size and Population Size from Quadratic Samples; Final Semester Examination (UAS).
38	MT507	Decision Theory	3	7	Linear Programming	This course is intended to provide students with insight and knowledge about solving problems regarding decision making and others in economics, industry, agriculture and many other fields.

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39	MT508	Methods in Multivariate Statistics	3	7	Linear Algebra, Basic Statistics, Theoretical Descriptive Statistics, Theoretical Inferential Statistics	This course is intended to provide insight and understanding to students about statistical concepts with multivariate data, and students can apply these concepts in solving everyday problems. The topics studied include aspects of multivariate, random matrix and random vector algebra, random sample, multivariate normal distribution, vector mean inference, multivariate means difference test (two groups, one and two-way Anova, Manova one path and two paths), multivariate regression models and path analysis, principal component analysis, factor analysis, canonical correlation analysis, discriminant analysis and group analysis.
40	MT510	Advanced Linear Algebra	3	7	Linear Algebra	This course provides a deeper insight into the concepts of complex vector spaces, direct sums, linear transformations, endomorphisms, quotient spaces, inner products, projectors, linear functionalities in inner product spaces, multi-linear mapping, determinants, values and eigenvectors, multiplicity, spectral theorem, singular values and vectors, least-squares solution.
41	MT511	Structure of Groups and Rings	3	7	Group Theory and Ring Theory	This course provides a deeper insight into the concepts of: simple & primitive rings and related theorems, Jacobson roots and related theorems, semi-simple rings and related theorems, prime roots, prime & semiprime rings and related

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						theorems, algebra and related theorems related, division algebra and related theorems.
42	MT512	Operator Algebra	3	8	Linear Algebra, Group Theory, Real Analysis, Introduction to Topology	This course is prepared to build student competence in the fundamental concepts of linear operators confined to Hilbert spaces and their algebraic structures. The materials discussed in this course are metric spaces, normed vector spaces, complete spaces, Banach spaces, Holder inequalities, Minkowski, Cauchy-Schwarz, Hilbert spaces, orthogonalities, the basis of Hilbert spaces, orthogonal projections, linear operators limited to Hilbert spaces, space vector of linear operators limited to Hilbert space, adjoins and their properties, norm of operators, isometric operators, partial isometry, unitary operators and Toeplitz operators, operator algebra, C^*-abstract algebra, ideal, commutative C^*- algebra, Gelfand representation, functional calculus, positive elements of C-algebra, C^* algebraic groups, basic concepts of tensor products, tensor products of Hilbert spaces, C^* algebraic tensor products, concepts of group action, dynamic systems, covariance representation, cross product, C^* algebra constructed by one element, algebra constructed by an operator, and Toeplitz algebra.

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43	MT515	Functional Analysis	3	7	Linear Algebra, Real Analysis	This course provides insight into normed vector spaces, convergence, finite linear operators, and Hilbert spaces and their various operators.
44	MT519	Optimization Methode	3	7	Operations Research	This course is intended to give students the ability to recognize and understand optimization problem-solving methods. In this course, students will study and examine: optimization problems without constraints, constrained optimization problems, column generation techniques, and heuristic methods and their implementation in Matlab. At the end of the lecture, students can learn and understand optimization methods currently being developed through lecture projects.
45	MT521	Analysis of Regresion and Correlation	3	6	Theoretical Descriptive Statistics, Theoretical Inferential Statistics	The material discussed in this lecture is the basics of statistics (normality test and homogeneity of variance test), simple regression linear (various variables, scatter plot, freehand method, least squares method, regression coefficient, linearity and significance test, freedom test variable), regression with categorical predictor, simple linear correlation (formulas, interpretation, interval estimation, significance test, grouped data correlation), multiple linear regression (classical assumption : multicollinearity, heteroscedasticity, autocorrelation, normality, significance test of regression coefficient, multiple regression with

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						qualitative independent variables), multiple linear correlations (formula, interpretation, significance test, partial correlation with interpretation), addition of independent variables to the model (forward technique, backward technique), various correlation in nonparametric statistics (correlation coefficient with Spearman rank, tau Kendall correlation coefficient, contingency coefficient, Cramer coefficient, phi coefficient).
46	MT523	Multimedia	3	7	-	This course is intended to provide knowledge about the use of multimedia in the presentation of mathematics. The materials discussed in this lecture are multimedia concepts, standard presentations, photos, videos, animations, and websites. The lecture method used is expository and practicum.
47	MT524	Method of Time Series	3	7	Theoretical Descriptive Statistics, Theoretical Inferential Statistics	This course is intended to have the knowledge, understanding and ability to identify, estimate parameters and verify the most suitable model (Box-Jenkin's model) from a set of time-series data. Furthermore, the most suitable model is used to forecast several future periods. Besides, theoretically, students are also expected to use appropriate software for time series data. In this course, students will study and examine the concepts of various forecasting models; basic

PROGRAM STUDI MATEMATIKA
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						concepts of time series; Box Jenkin's time series models, both stationary (AR, MA, ARMA) and non-stationary (ARI, IMA, ARIMA models); Model-identification, model parameter estimation, model verification, and forecasting several steps forward for stationary and non-stationary time series.
48	MT525	Applied Algebra	3	7	Linear Algebra, Group Theory,	This course provides insight into the application of algebra in the field of coding theory. The lecture material includes the concept of linear code, matrix generator, dual code, cyclic code, and code correction principles.
49	MT527	Topology	3	6	Real Analysis, Analisis Real, Introduction to Topology	This course discusses: This course discusses: Metric and Example Spaces; Sequence on Metric space, Continuity on Metric space; Compactness and Connectedness; The Baire Category Theorem; Topology room; Base and Subbase in the Topology space; Continuous Function in Topology space; Quotient Room; Convergence of functions; Normal Space and Local Compact Space.
50	MT529	Econometrics	3	6	Basic Statistics, Theoretical Descriptive Statistics, Theoretical	In this course, students will identify and discuss knowledge about the scope and objectives of econometrics; identify econometric methodologies and types of econometrics; identify regression analysis as the main tool in econometrics, identify

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					Inferential Statistics, Data Processing	and discuss problems and deviations from the classical assumptions of regression analysis; identify other econometric models, and apply and identify economic theory by using empirical or observational data to obtain an econometric model to arrive at a conclusion or prediction of an economic problem
51	MT530	Bayesian Theory	3	8	Theoretical Descriptive Statistics, Theoretical Inferential Statistics	After attending this course, students are expected to understand, understand and master Bayesian and empirical Bayes theories and apply them to real problems. This lecture discusses the Bayes theorem, Bayesian Inference, Bayesian Paradigm, Prior Information, Decision theory, Point estimation, Test and credible region, Bayesian computing.
52	MT532	Live Times	3	7	Theoretical Descriptive Statistics, Theoretical Inferential Statistics	This course is intended to provide students with insight and knowledge about the basic concepts of life testing; survival function, hazard function, cumulative hazard function, mean residual life; some important distributions in the live test; censorship (complete sample, type I, and type II censorship), truncation; Likelihood method for complete sample, censored data I, and censored data II; and parametric estimation in live test data analysis. Lecture materials include: 1) Introduction (basic concepts of life test: 2) Relationship between

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						survival function, hazard function, cumulative hazard function, mean residual life; 3) Some important distributions in the live test (exponential, Weibull, gamma, extreme values, log normal, Pareto, Gomprezt, Logistics log, Gamma log, and Gaussian inverse); 4) Censorship (complete sample, type I and type II censorship), truncation; 5) Likelihood method for complete sample, censored data I, and censored data II; and 6) Parametric estimation in live test data analysis
53	MT534	Dynamic System	3	7	Linear Algebra, Ordinary Differential Equations	This course is intended so that students can have knowledge and understanding of the basic concepts of ordinary differential equations systems, phase planes, solve first-order linear GDP systems, analyze the stability of critical points of systems of differential equations both linear and nonlinear and can use concepts system dynamics to study the dynamics of a system from related physical and biological problems.
54	MT535	Function Series and Riemann Integral	3	7	Differential Calculus, Integral Calculus, Real Analysis, and Introduction to Topology	This course discusses: This course discusses: Sequences of functions on the set of Real numbers; Uniform convergence, Absolute convergence; Rearrangements of function sequences; Absolute convergence test on the set of real numbers; Convergence test is not absolute on the set of real numbers; Function series and uniform

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						convergence; Definition of Riemann Integral; Properties of the Riemann Integral; the Cauchy criterion and the Apit theorem; and the Fundamental Theorems of Calculus.
55	MT536	Theory of Measure and Integral	3	8	Function Series and Riemann Integral	This course discusses: Sequences of functions on the set of Real numbers; Uniform convergence, Absolute convergence; Rearrangements of function sequences; Absolute convergence test on the set of real numbers; Convergence test is not absolute on the set of real numbers; Cauchy-Hadamard theorem on the set of real numbers; Sequences and subsequences in Rn; The criteria for the convergence of the sequence at Rn; and the sequence of functions in Rn.
56	MT537	Matrics Algebra	3	6	Differential Calculus, Linear Algebra	This course discusses the general scope of (finite) matrices, both in terms of operations and properties. This course will present the concept of matrix similarity and its consequences and (algorithm) matrix decomposition in a focused manner. In addition, the concept of a "size" matrix is also presented through related concepts.
57	MT538	Graph Algebra	3	8	Operator Algebra	The material discussed in this course is the basic concepts of directed graphs, matrices related to graphs, Cuntz-Krieger family of directed graphs, C^* algebra related to directed graphs and their

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						universal properties, gauge-invariant uniqueness theorem, Cuntz-Invariant uniqueness theorem. Krieger, application of uniqueness theorems in graph algebra and simplicity and ideals in graph algebra.
58	MT541	Nonpametical Statistics	3	6	Theoretical Inferential Statistics	In this course, students will study and examine the concepts of Introduction: Measurement Scale, Characteristics of Nonparametric Statistics, Hypothesis Testing Procedures; One-Sample Data Analysis: Normality Test, Binomial Test, Run Test, Chi-Square Test; Data Analysis of Two Independent Samples: Median Test, Mann-Whitney Test, Kolmogorov-Smirnov Test, Run Wald-Wolfowitz Test; Data Analysis of Two Related Samples: McNemar Test, Wilcoxon Sign Rank Test, Sign Test; Data Analysis of Two Independent Samples: Kruskal-Wallis Test; Data Analysis of More Two Related Samples: Friedman Test; Big Data Analysis Relationship of Two Variables: Correlation in Nonparametric Statistics, Spearman Rank Correlation, Contingency Correlation, Biserial Point Correlation, Biserial Correlation, Kendall Rank Correlation.
59	MT542	Cryptography	3	8	Number Theory, Basic Statistics, Ring Theory	This course is intended to provide knowledge about cryptography, cryptosystems, classical cryptography, and modern cryptography. The

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						materials discussed in this lecture are steganography, cryptography, cryptosystems, encryption, decryption, cryptanalysis, Caesar cypher, Slide cypher, Substitution cypher, Affine cypher, Vigenere cypher, Transposition cypher, Hill cypher, One-time Pad, ring theory in cryptography, fields to primes, DES, AES, modern cryptography, prime number theory, public keys, RSA, El-Gamal, ECC, Hash Functions, and Digital Signatures. The lecture method used is expository and is accompanied by practicum.
60	MT591	Internship Program	4	7/8	Selected Topics in Mathematics	The Academic Training Program (PLA) is one of the practical work activities within the Mathematics Study Program, as a subject that must be taken by every student of the Mathematics Study Program, Department of Mathematics Education, FPMIPA UPI. Practical Work Activities are internship activities in companies or related institutions to gain work experience.