LIST OF COURSES OFFERED TO INTERNATIONAL STUDENTS
NON-DEGREE PROGRAM
ODD SEMESTER, ACADEMIC YEAR 2026/2027
Faculty of Mathematics and Natural Sciences - Universitas Indonesia

Course Name: Calculus 1
Course Code: SCMA601002
Course Credits: 3

Degree	Undergraduate Program
Department/Study Program	Mathematics/Mathematics Undergraduate
Type of Class	Regular
Language of Instruction	English
Lecturer Name	Team
Course Structure	Lecture and lab works
Course Overview	This course introduces the fundamental concepts of single-variable calculus. It covers real numbers and inequalities, functions and graphs, limits and continuity, derivatives and their applications, definite and indefinite integrals, the Fundamental Theorem of Calculus, applications of integrals, inverse and transcendental functions, and advanced integration techniques. Learning activities include lectures, lab works, quizzes, homework, and independent study.
Course Key Words	Single-variable calculus, functions, limits, derivatives, integrals, transcendental functions
Academic Goal	After completing this course, students will be able to: - Determine solution sets of inequalities involving absolute values. - Determine the domain, codomain, range, operations, and graphs of one-variable functions. - Determine limits, continuity, and derivatives of one-variable functions. - Solve mathematical problems involving derivatives and integrals of one-variable functions. - Compute derivatives and integrals involving inverse and transcendental functions. - Apply advanced integration techniques.

Course Schedule	1. Real numbers, inequalities, absolute values, and Cartesian coordinates 2. Functions, graphs, operations on functions, and trigonometric functions 3. Limits: intuition, definition, and basic theorems 4. Trigonometric limits, limits at infinity, infinite limits, and continuity 5. Definition and rules of derivatives; derivatives of trigonometric functions 6. Chain rule, higher-order derivatives, implicit differentiation, related rates, and differentials 7. Maximum and minimum, monotonicity, concavity, local extrema, and graphing functions 8. Midterm Examination 9. Mean Value Theorem for derivatives and antiderivatives 10. Definite integrals, the Fundamental Theorem of Calculus, and substitution method 11. Mean Value Theorem for integrals, symmetry, and area 12. Volumes of solids of revolution 13. Natural logarithmic and exponential functions 14. Inverse functions, general exponential and logarithmic functions, and hyperbolic functions 15. Advanced integration techniques: integration by parts, trigonometric integrals, rationalizing substitution, and partial fractions 16. Final Examination
Textbooks, References, and Supplementary Materials	- Varberg, D.; Purcell, E. J.; Rigdon, S. E. Calculus, 9th ed., Prentice Hall, 2007. - Finney, R. L.; Weir, M. D.; Giordano, F. R. Thomas' Calculus, 10th ed., Addison-Wesley, 2001. - Lecturer's handouts. - Videos and supplementary learning materials.
Grading Component	- Online Quiz: 10% - Homework: 15% - Written Quiz: 10% - Lab Sessions: 5% - Midterm Exam: 30% - Final Exam: 30%
Other (i.e. Expectations on Classroom Conduct and Decorum etc.)	Students are expected to: - Attend all classes regularly and on time. - Participate actively in discussions and learning activities. - Maintain respectful behavior toward instructors and peers. - Avoid any form of academic dishonesty including plagiarism and cheating.

LIST OF COURSES OFFERED TO INTERNATIONAL STUDENTS
NON-DEGREE PROGRAM
ODD SEMESTER, ACADEMIC YEAR 2026/2027
Faculty of Mathematics and Natural Sciences - Universitas Indonesia

Course Name: Elementary Linear Algebra
Course Code: SCMA601003
Course Credits: 2

Degree	Undergraduate Program
Department/Study Program	Department of Mathematics/Undergraduate Mathematics Study Program
Type of Class	Regular
Language of Instruction	English
Lecturer Name	Team
Course Structure	Lecture
Course Overview	This course introduces the basic theory and applications of elementary linear algebra. It covers systems of linear equations, Gaussian and Gauss-Jordan elimination, matrices and matrix operations, invertible matrices, matrix transformations, applications of linear systems, determinants, vectors in Euclidean spaces, orthogonality, geometry of linear systems, cross products, and eigenvalues and eigenvectors. Learning activities include lectures, lab works, quizzes, homework, and independent study.
Course Key Words	Linear systems, matrices, determinants, vector spaces, Euclidean spaces, eigenvalues, eigenvectors
Academic Goal	After completing this course, students will be able to: - Explain basic concepts of systems of linear equations and matrices. - Solve systems of linear equations using Gaussian elimination and Gauss-Jordan elimination. - Calculate inverse matrices and determinants. - Determine standard matrices of transformations and apply linear systems to simple problems. - Explain vectors in Euclidean spaces and solve geometry problems in $\mathbb{R}^2$ and $\mathbb{R}^3$. - Determine eigenvalues and eigenvectors of matrices.

Course Schedule	1. Introduction to systems of linear equations 2. Gaussian elimination and Gauss-Jordan elimination 3. Matrices and matrix operations 4. Algebraic properties of matrices 5. Elementary matrices and a method for finding inverse matrices 6. More on linear systems and invertible matrices 7. Diagonal, triangular, and symmetric matrices 8. Midterm Examination 9. Matrix transformations 10. Applications of linear systems 11. Determinants by cofactor expansion and row reduction 12. Properties of determinants and Cramer's Rule 13. Vectors in 2-space, 3-space, and n-space 14. Norm, dot product, distance, and orthogonality 15. Geometry of linear systems, cross product, eigenvalues, and eigenvectors 16. Final Examination
Textbooks, References, and Supplementary Materials	- Anton, H.; Rorres, C. Elementary Linear Algebra: Applications Version, 11th ed., John Wiley, 2014. - Lecturer's handouts. - Videos and supplementary learning materials.
Grading Component	- Online Quiz: 10% - Homework: 15% - Written Quiz: 10% - Lab Sessions: 5% - Midterm Exam: 30% - Final Exam: 30%
Other (i.e. Expectations on Classroom Conduct and Decorum etc.)	Students are expected to: - Attend all classes regularly and on time. - Participate actively in discussions and learning activities. - Maintain respectful behavior toward instructors and peers. - Avoid any form of academic dishonesty including plagiarism and cheating.

LIST OF COURSES OFFERED TO INTERNATIONAL STUDENTS
NON-DEGREE PROGRAM
ODD SEMESTER, ACADEMIC YEAR 2026/2027
Faculty of Mathematics and Natural Sciences - Universitas Indonesia

Course Name: Discrete Mathematics
Course Code: SCMA601010
Course Credits: 3

Degree	Undergraduate Program
Department/Study Program	Department of Mathematics/Undergraduate Mathematics Study Program
Type of Class	Regular
Language of Instruction	English
Lecturer Name	Team
Course Structure	Lecture
Course Overview	Discrete Mathematics is a mandatory course in the Undergraduate Mathematics Study Program. This course consists of several topics related to problems in integers or discrete objects, including number theory, recursive functions and equations, counting, relations, and graphs. Learning activities include lectures, independent study, discussions and feedback, group and individual assignments.
Course Key Words	Counting, graph, number theory, recursive function
Academic Goal	After completing this course, students will be able to: - Explain properties of number theory. - Construct recursive functions from discrete problems. - Solve simple combinatorics problems. - Solve counting problems. - Solve problems related to recursive functions. - Explain properties of partially ordered relations. - Choose graph models for finding optimal solutions.
Course Schedule	1. Motivation, properties of integers, and division algorithm 2. Congruence modulo m and integer representation 3. Prime and composite numbers and their application in cryptography 4. Linear congruence, Chinese Remainder Theorem, and Fermat's Little Theorem 5. Recursive functions and applications in cryptography 6. Structural induction 7. Basic counting and the Pigeonhole Principle

	8. Permutation, combination, and the Binomial Theorem 9. Midterm Examination 10. Linear recurrence relations 11. Generating functions and the inclusion-exclusion principle 12. Relations and equivalence relations 13. Partially ordered sets and lattices 14. Graphs, connectivity, and graph representation 15. Euler and Hamiltonian paths and cycles 16. Final Examination
Textbooks, References, and Supplementary Materials	- Rosen, K. H. Discrete Mathematics and Its Applications, 7th ed., McGraw-Hill, 2012/2013. - Kolman, B.; Busby, R. C.; Ross, S. Discrete Mathematical Structures, 5th ed., Prentice Hall, 2003. - Lecturer's handouts. - Videos and supplementary learning materials.
Grading Component	- Midterm Exam: 25% - Final Exam: 30% - Assignments: 20% - Quiz: 15% - Poster: 10%
Other (i.e. Expectations on Classroom Conduct and Decorum etc.)	Students are expected to: - Attend all classes regularly and on time. - Participate actively in discussions and learning activities. - Maintain respectful behavior toward instructors and peers. - Avoid any form of academic dishonesty including plagiarism and cheating.

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NON-DEGREE PROGRAM
ODD SEMESTER, ACADEMIC YEAR 2026/2027
Faculty of Mathematics and Natural Sciences - Universitas Indonesia

Course Name: Discrete Mathematics
Course Code: SCMA602016
Course Credits: 3

Degree	Undergraduate Program
Department/Study Program	Department of Mathematics/Undergraduate Mathematics Study Program
Type of Class	Regular
Language of Instruction	English
Lecturer Name	Team
Course Structure	Lecture
Course Overview	This course covers undirected graphs, directed graphs, trees and forests, graph coloring, graph representations, and graph applications. The learning method in this course is active learning, utilizing small group discussions to apply the theory learned after face-to-face lectures. The learning strategies used are flipped class, problem-based learning, discussions, presentations, and group and individual assignments.
Course Key Words	Graph, tree, coloring, graph application
Academic Goal	After completing this course, students will be able to: - Explain the basic concepts of graph theory and their properties. - Use graphs as a tool to model real-world problems, including transportation and clustering problems. - Use graph labeling, Ramsey numbers, or coloring as tools to solve related problems. - Communicate effectively to explain graph theory concepts. - Present the results of group discussions or research.
Course Schedule	1. Introduction: motivation, basic graph theory, and PBL teaching and learning strategy 2. Undirected graphs, connected graphs, and types of graphs 3. Degree of a graph and isomorphism 4. Adjacency matrix 5. Trees 6. Connectivity

	7. Graph coloring 8. Midterm Examination 9. Directed graphs 10. Project 11. Project 12. Project 13. Project 14. Project 15. Project 16. Final Presentation
Textbooks, References, and Supplementary Materials	- Chartrand, G.; Zhang, P. A First Course in Graph Theory, McGraw-Hill, 2015. - West, D. B. Introduction to Graph Theory, Prentice Hall, 2001. - Various articles for project work.
Grading Component	- Midterm Exam: 30% - Final Presentation: 30% - Quiz: 10% - Assignments: 15% - Group Discussion: 15%
Other (i.e. Expectations on Classroom Conduct and Decorum etc.)	Students are expected to: - Attend all classes regularly and on time. - Participate actively in discussions and learning activities. - Maintain respectful behavior toward instructors and peers. - Avoid any form of academic dishonesty including plagiarism and cheating.