CUMHURIYET UNIVERSITY FACULTY OF EDUCATION SECONDARY SCIENCE AND MATHEMATICS EDUCATION DEPARTMENT, MATHEMATICS EDUCATION DIVISION UNDERGRADUATE PROGRAM COURSE DESCRIPTIONS

1st SEMESTER

CODE	COURSE TITLE	T	P	C	ECTS
OMÖ1001	Analysis-I	4	2	5	10
OMÖ1003	Abstract Mathematics- I	3	0	3	3
OMÖ1005	Analytical Geometry-I	3	0	3	3
OMÖ1007	Physical-I	4	0	4	4
OMÖ1009	Introduction to Education Science	3	0	3	3
ENF1011	Use of Basic Computer Technologies	1	2	0	3
TÜR1001	Turkish Language-I	2	0	2	2
YDĐL1001	Foreign Language-I	2	0	2	2
	TOTAL	22	4	22	30

I. SEMESTER

OMÖ1001 ANALYSIS-I (4–2–5): Real numbers (rational numbers, infinite decimals, supremum and infimum of number sets, operations on real numbers), real number sequences, limit of sequences, properties of convergent sequences, bounded and monotonic sequences, nested intervals theorem, Bolzano-Weierstrass Theorem, Cauchy sequence, functions, limit of a function, continuity of a function, continuity of some simple functions, calculation of function limits, derivative and differential, differentiation rules, higher-order derivative and differential, fundamental theorems for differentiable functions, Taylor's formula and L'Hospital's rule, investigation of functions using derivatives, curve sketching and polar coordinates.

OMÖ1003 ABSTRACT MATHEMATICS-I (3-0-3): Propositions, algebra of propositions, methods of mathematical proof and quantifiers, the concept of set and algebra of sets, families of sets and their properties, Cartesian product of sets and properties satisfied by the product, definition of relation and properties of a relation, equivalence relation, equivalence class and quotient set, partial order relation, total order relation, definitions and examples of maximal-minimal elements, concepts of greatest-least element, least upper bound (supremum), greatest lower bound (infimum), definition of function and types of functions, definition and properties of composite function, inverse of a function.

OMÖ1005 ANALYTIC GEOMETRY-I (3-0-3): What is analytic geometry? Second and third-degree determinants, solution of linear equation systems with two and three unknowns using determinants, planar coordinates (number line and basic principle, Cartesian coordinates, parallel coordinates, polar coordinates), Cartesian coordinates in space, vectors, coordinate transformations in the plane, curves (definition of curve and various representations), classification of planar curves, conics (circle, ellipse, hyperbola, parabola).

OMÖ1007 PHYSICS-I (4-0-4): Physics and measurement, vectors, motion in one dimension, motion in two dimensions, laws of motion, circular motion, work and energy, potential energy, conservation of energy, linear momentum and collisions, rotation of rigid bodies around a fixed axis, rolling motion, angular momentum and torque.

OMÖ1009 INTRODUCTION TO EDUCATIONAL SCIENCE (3-0-3): Basic concepts of education, relationship and functions of education with other sciences (philosophical, social, legal, psychological, economic, political foundations of education), historical development of educational science, trends in educational science in the 21st century, research methods in educational science, structure and properties of the Turkish National Education System, the role of the teacher in the education system, characteristics of the teaching profession, applications and developments in the field of teacher training.

ENF1011 BASIC COMPUTER TECHNOLOGIES USAGE (1-2-0): Basic computer knowledge, operating systems, word processing program (Microsoft Word), arithmetic spreadsheet and graphics program (Microsoft Excel), database processing program (Microsoft Access), presentation preparation program (Microsoft PowerPoint), Internet and webpage preparation (FrontPage).

TÜR1001 TURKISH LANGUAGE-I (2-0-2): Basic characteristics of written language and written communication, fundamental differences between written and spoken language. Expression: written and oral expression; subjective expression, objective expression; paragraph; paragraph types (introduction-developmentconclusion paragraphs). Definition of text and text types (informative texts, literary texts); conditions for being a text (cohesion, coherence, intentionality, acceptability, situationality, informativity, intertextuality). Written expression (written composition: free writing, planned writing); stages of planned writing (topic, limiting the topic, purpose, point of view, determination of main and supporting ideas; preparing a writing plan, paper layout); theoretical information on informative texts (petition, letter, news, decision, announcement/advertisement, minute, report, official writings, scientific writings); studies on examples and writing applications; summarizing and outlining a text; correcting language and expression errors in written applications.

YDİL1001 FOREIGN LANGUAGE-I (2-0-2): Motivating students for effective learning, ensuring their participation in classes and systematic preparation for all skills required for successful written and spoken communication. Presentation and comprehensive practice of all grammar structures appropriate for the beginner level. (Verb to be, have got, indefinite articles, pronouns, there is/ are, some and any, Wh-questions, imperatives, can, present tenses, future simple tenses, would like to, have to, must, don't have to.) .

2nd Semester

CODE	COURSE TITLE	T	P	C	ECTS
OMÖ1002	Analysis-II	4	2	5	10
OMÖ1004	Abstract Mathematics-II	3	0	3	3
OMÖ1006	Analytical Geometry-II	3	0	3	3
OMÖ1008	Physical-II	4	0	4	4
OMÖ1010	Developmental Psychology	3	0	3	3
ENF1012	Basic Computer Science	2	2	3	3
TÜR1002	Turkish Language-II	2	0	2	2
YDĐL1002	Foreign language-II	2	0	2	2
	TOTAL	23	4	25	30

II. SEMESTER

OMÖ1002 ANALYSIS-II (4-2-5): Indefinite integral and its properties, basic integration methods, integration of rational, irrational, trigonometric, and hyperbolic functions, definite integral in the sense of Riemann, definition, properties of the definite integral, fundamental theorems of integral calculus, definite integral calculation and applications, calculation of area, calculation of arc length, areas of surfaces of revolution, volumes of solids of revolution, series, properties of convergent series, non-negative series, absolute and conditionally convergent series, uniform convergence of function sequences and function series, power series and Taylor series, generalized integrals.

OMÖ1004 ABSTRACT MATHEMATICS-II (3-0-3): Binary operation, groups, subgroups, and homomorphism of groups. Number systems: Natural numbers, integers, rational, and real numbers. Well-ordered sets, axioms of choice. Equipotent sets, finite and infinite sets. Countable sets.

OMÖ1006 ANALYTIC GEOMETRY-II (3-0-3): Line and plane in space, surfaces, graph of a surface, intersection curve of two surfaces, sphere, cylinder, cone, ruled surfaces and surfaces of revolution, ellipsoid, hyperboloid, and paraboloid, space curves, spherical and cylindrical coordinates, hyperplane and hypersufaces.

OMÖ1008 PHYSICS-II (4-0-4): Electric fields, Gauss's law, electric potential, capacitance and dielectrics, current and resistance, DC circuits, magnetic fields, sources of magnetic field, Faraday's laws, inductance, alternating current circuits.

OMÖ1010 DEVELOPMENTAL PSYCHOLOGY (3-0-3): Basic concepts and principles related to development, developmental theories, developmental periods, physical, cognitive, personality, and moral development in childhood and adolescence, problems of adolescence and ways to cope with them.

ENF1012 BASIC COMPUTER SCIENCE (2-2-3): Programming language, computer networks, open operating systems.

TÜR1002 TURKISH LANGUAGE-II (2-0-2): Basic characteristics of spoken language and oral communication. Oral expression; basic characteristics of speaking skill (using natural language and body language); basic principles of a good speech; basic characteristics of a good speaker (emphasis, intonation, pause; diction, etc.). Unprepared and prepared speaking; stages of prepared speaking (selecting and limiting the topic; purpose, point of view, determination of main and supporting ideas, planning, writing the text; presentation of the speech). Types of speeches: (mutual conversations, interview, self-introduction, answering questions, celebrating an important event like New Year's, birth, holiday, etc., giving directions, talking on the phone, asking for a job, interviewing someone/conducting a report, radio and television speeches, participating as a speaker in various culture and art programs, etc.). Making unprepared speeches on various topics, studies on speech examples and oral expression applications, correcting language and expression errors in speeches.

YDİL1002 FOREIGN LANGUAGE-II (2-0-2): Structuring students' speaking skills for successful communication in the English language. Listening exercises to help them correctly hear what they listen to and respond with proper pronunciation. Providing useful writing skills to students by giving them step-by-step instructions. (Past tenses, adverbs, adjective degrees, too and enough, past continuous, conditionals type 0 and type I, past modals.) .

3rd SEMESTER					
CODE	COURSE TITLE	T	P	C	ECTS
OMÖ2001	Analysis-III	4	2	5	10
OMÖ2003	Linear Algebra-I	3	2	4	7
OMÖ2011	Differential Equations-I	2	2	3	6
OMÖ2013	Curriculum Development and Instruction	3	0	3	3
ATA1001	Atatürk's Principles and Revolutionary History-I	2	0	2	2
YDĐL2001	Foreign Language-III	2	0	2	2
	TOTAL	16	6	19	30

3rd SEMESTER

OMÖ2001 ANALYSIS-III (4-2-5)

N-dimensional space, vector-valued functions, n-dimensional curves, multivariable functions, limit and continuity, partial derivatives and total differentials, partial derivatives of composite functions, directional derivative and gradient, higher-order partial derivatives and differentials, Taylor's formula, extrema, maximum and minimum of functions, geometric meaning of partial derivatives and differential, differentiable transformations, inverse transformations, implicit functions, dependence of functions, surfaces, constrained extrema (Lagrange Multipliers), scalar and vector fields, integrals depending on a parameter.

OMÖ2003 LINEAR ALGEBRA-I (3-2-4)

Matrices (concept of matrix, basic operations on matrices), permutations and determinants, properties of determinants, inverse matrix, basis minor of a matrix, rank of a matrix, elementary row and column operations, echelon, row-equivalent, and normal forms of a matrix, elementary matrices, vector spaces (basic definition and properties, basis and dimension, isomorphism, subspaces, sum, intersection, and direct sum of subspaces), basis and coordinate transformations in n-dimensional vector spaces, systems of linear equations.

OMÖ2011 DIFFERENTIAL EQUATIONS-I (2-2-3)

Basic definitions, Cauchy problem, differential equation of a family of curves. First-order differential equations (separable variables, homogeneous, linear, exact differential equations, Euler-Riccati equation, equations not solvable for the derivative). Applications of first-order differential equations in geometry and physics, existence and uniqueness theorems, singular solutions, higher-order differential equations (integrable nonlinear equations, reducible order equations, homogeneous linear differential equations with constant coefficients, for nonhomogeneous linear differential equations with constant coefficients: (i) method of undetermined coefficients (ii) method of variation of parameters (iii) operator method).

OMÖ2013 CURRICULUM DEVELOPMENT AND INSTRUCTION (3-0-3)

Basic concepts, theoretical foundations of curriculum development in education (historical, philosophical, psychological, and social foundations), curriculum design and models, curriculum development process (planning, design preparation, trial-evaluation, ensuring program continuity), principles of instruction, importance and benefits of planned work in instruction, planning of instruction (unitized annual plan, daily plan and activity examples), instructional methods and techniques, relating them to practice, new trends in education and instruction (active learning, multiple intelligences, constructivism, lifelong learning, creative thinking, etc.), teacher's duties and responsibilities in improving the quality of the instructional service.

ATA1001 ATATÜRK'S PRINCIPLES AND HISTORY OF THE TURKISH REVOLUTION-I (2-0-2)
Concepts, definitions, description of course methods and resources, Industrial Revolution and French Revolution, Dissolution of the Ottoman Empire (19th Century), Tanzimat and Islahat Edicts, I. And II.
Constitutional Era, Trablusgarp and Balkan Wars, World War I, Armistice of Mudros, Wilson Principles, Paris Conference, M. Kemal's Arrival in Samsun and the Situation in Anatolia, Amasya Circular, National Congresses, Opening of the Assembly of Deputies, Establishment of the Turkish Grand National Assembly (TBMM) and Internal Rebellions, Teşkilat-ı Esasi Kanunu (Fundamental Law), Establishment of the Regular Army, I. İnönü, II. İnönü, Kütahya-Eskişehir, Battle of Sakarya and the Great Offensive, Treaties during the War of Independence, Treaty of Lausanne, Abolition of the Sultanate.

YDİL2001 FOREIGN LANGUAGE-III (2-0-2)
Teaching all main topics in grammar and providing practice of the information given with motivating and realistic tasks that encourage students' own initiative. Practice of writing skills by presenting composition analyses and various writing models. (All tenses, relative clauses, reported speech, causatives, adverbial clauses)

4th SEMESTER

CODE	COURSE TITLE	T	P	C	ECTS
OMÖ2002	Analysis-IV	4	2	5	10
OMÖ2004	Linear Algebra-II	3	2	4	7
OMÖ2012	Differential Equations-II	2	2	3	6
OMÖ2014	Instructional Technologies and Material Design	2	2	3	3
ATA1002	Atatürk's Principles and Revolutionary History-II	2	0	2	2
YDĐL2002	Foreign Language-IV	2	0	2	2
	TOTAL	15	8	19	30

IV. SEMESTER

OMÖ2002 ANALYSIS-IV (4-2-5)
Multiple integrals, reduction of multiple integrals to iterated integrals, change of variables in multiple integrals, improper multiple integrals, applications of double and triple integrals, line integrals of the first and second kind, Green's formula, independence of the line integral of the second kind from the path of integration, surfaces in three-dimensional space, curvilinear coordinates, orientation of a surface, surface integrals of the first and second kind, fundamental formulas for surface integrals.

OMÖ2004 LINEAR ALGEBRA-II (3-2-4)
Inner product spaces, orthogonal basis, Gram-Schmidt method. Linear transformations, definition and basic properties, space of linear transformations, matrix form of a linear transformation, change of matrix of a linear transformation, characteristic polynomial, eigenvalue and eigen-functions, diagonalization, similarity to a diagonal matrix, Cayley-Hamilton theorem, linear functionals and dual spaces (linear functionals, dual bases, second dual space), bilinear, quadratic, Hermitian forms. Canonical forms.

OMÖ2012 DIFFERENTIAL EQUATIONS-II (2-2-3)
Linear differential equations with variable coefficients (fundamental system of solutions, Wronskian and linear independence, general solution of non-homogeneous linear differential equations with variable coefficients, Cauchy-Euler equation), systems of differential equations (non-homogeneous linear differential equation systems with variable coefficients, fundamental solution matrix of the system, Wronskian, method of variation of constant vectors, non-homogeneous linear systems with constant coefficients, Euler method, nonlinear systems, normal systems), boundary value problems, Green's function, solution of differential equations in terms of power series, stability and phase trajectories, singular points, phase analysis.

OMÖ2014 INSTRUCTIONAL TECHNOLOGIES AND MATERIAL DESIGN (2-2-3)

Concepts related to Instructional Technology, characteristics of various instructional technologies, the place and use of instructional technologies in the instructional process, determining the technology needs of the school or classroom, planning and execution of appropriate technology, development of two- and three-dimensional materials through instructional technologies, development of instructional materials (worksheets, activity design, overhead transparencies, slides, visual media (VCD, DVD) materials, computer-based materials), examination of educational software, evaluation of instructional materials of various qualities, Internet and distance education, visual design principles, research on the effectiveness of instructional materials, state of instructional technology use in Turkey and the world.

ATA1002 ATATÜRK'S PRINCIPLES AND HISTORY OF THE TURKISH REVOLUTION-II (2-0-2)

Revolutions in the political field, political parties and attempts to transition to multi-party political life, revolutions in the legal field, regulation of social life, innovations in the economic field, Turkish foreign policy in the 1923–1938 period, Turkish foreign policy after Atatürk, principles of the Turkish revolution—republicanism, populism, secularism, revolutionism, statism—and complementary principles.

YDİL2002 FOREIGN LANGUAGE-IV (2-0-2)

Translation studies of various reading passages that develop reading and writing skills by modeling real-life situations and their professional fields, which can serve as a model for students' professional lives after university.

5th SEMESTER

CODE	COURSE TITLE	T	P	C	ECTS
OMÖ 3021	Functions of a Complex Variable-I	2	2	3	7
OMÖ3023	Topology-I	3	0	3	7
OMÖ3007	Partial Differential Equations	2	2	3	8
OMÖ3025	Democracy and Human Rights	2	0	2	2
OMÖ3019	*** Health Information and First Aid (Elective)**	**2**	**0**	**2**	**2**
OMÖ3029	*** Professional Foreign Language (Elective)**	**2**	**0**	**2**	**2**
OMÖ3031	*** A Course Decided Appropriate by the Department (Elective)**	**2**	**0**	**2**	**2**
OMÖ3027	Special Teaching Methods-I	2	2	3	4
	TOTAL	13	6	16	30

V. SEMESTER (One of the marked courses will be selected)

OMÖ3021 FUNCTIONS OF A COMPLEX VARIABLE I (2-2-3)

Complex numbers, sequences and series of complex numbers, curves in the complex plane, complex functions, limit and continuity in complex functions. Power, exponential, logarithm, trigonometric, hyperbolic, inverse trigonometric, and inverse hyperbolic functions. Differentiability in complex functions, analytic functions, harmonic functions, geometric meaning of the derivative, conformal mappings, integral of complex functions, Cauchy integral theorem, Cauchy integral formula.

OMÖ3023 TOPOLOGY-I (3-0-3)

Topological Structures (concept of topology, concepts of open set, closed set, topology of real numbers, plane topology; metric topology). Basis and subbasis, neighborhood (concept of basis, properties of basis, equivalent basis, subbasis). Closure and accumulation points, closure, exterior, and boundary, density, continuity, homeomorphism.

OMÖ3007 PARTIAL DIFFERENTIAL EQUATIONS (2-2-3)
First-order equations with one unknown, general solutions of linear and quasi-linear equations and Cauchy problem, nonlinear partial differential equations. Second-order linear partial differential equations with two independent variables, Cauchy problem and classifications, canonical forms. Cauchy problem for the onedimensional wave equation, D'alambert solution, non-homogeneous wave equation, elliptic equations, Laplace equation, maximum principle, boundary value problems and Green's function. Parabolic equations, initial and initial-boundary value problems, fundamental solutions and Green's function, exact solution methods, methods of separation of variables and integral transformations.

OMÖ3025 DEMOCRACY AND HUMAN RIGHTS (2-0-2)
Definition and historical development of human rights and democracy. Concepts of democracy, freedom and equality, different understandings of democracy, democratic culture, democracy in school and family, democratic citizenship. Rights and freedoms, children's and women's rights, national and international regulations regarding human rights (Universal Declaration of Human Rights, European Convention on Human Rights, Convention on the Rights of the Child, etc.). Fundamental problems in the field of human rights, human rights and democracy education.

OMÖ3019 HEALTH KNOWLEDGE AND FIRST AID (Elective) (2-0-2)
Definition of health and basic health concepts, personal hygiene and cleanliness, oral and dental health, family planning and family health, habits harmful to health, nutrition and health, contagious diseases and ways to protect against them. Definition and importance of first aid, first aid rules and applications.

OMÖ3029 VOCATIONAL FOREIGN LANGUAGE (Elective) (2-0-2)
Translation of different types of texts from English to Turkish and from Turkish to English.

OMÖ3031 A COURSE DEEMED APPROPRIATE BY THE DEPARTMENT (Elective) (2-0-2)

OMÖ3027 SPECIAL TEACHING METHODS-I (2-2-3)
What is Mathematics? Why do we teach Mathematics? Importance of mathematics in the secondary education curriculum. Examination of the curriculum (Rationale for Change in the Curriculum; Aims of Mathematics Education and basic elements of the program, vision, approach, conceptual structure of the program, which topics are included in the high school mathematics program? Logic, algebra, probability and statistics, trigonometry, linear algebra, basic mathematics learning areas and related activities). Learning outcomes in the secondary education curriculum, discussion of learning areas. Researching the relationship of secondary school mathematics learning areas to primary school mathematics areas and university mathematics. How should mathematics be taught? Strategy methods and techniques such as discovery learning strategy, presentation learning strategy, inquiry learning strategy, diagnostic instruction, cooperative learning method, constructivism, problem-based learning, project-based learning. Concept misconceptions in mathematics and ways to eliminate them, cognitive conflict, concept maps. Teaching of concepts in the secondary education curriculum and use of alternative methods.

6th SEMESTER					
CODE	**COURSE TITLE**	**T**	**P**	**C**	**ECTS**
OMÖ3016	Functions of a Complex Variable-II	2	2	3	7
OMÖ3018	Topology-II	3	0	3	7
OMÖ3020	Numerical Analysis	4	0	4	7
OMÖ3026	*** Scientific Research Methods (Elective)**	**2**	**0**	**2**	**2**
OMÖ3028	*** Web Design (Elective)**	**2**	**0**	**2**	**2**
OMÖ3030	***** A Course Deems Appropriate by the Department (Elective)	**2**	**0**	**2**	**2**
OMÖ3022	Special Teaching Methods-II	2	2	3	4
OMÖ3024	Learning and Teaching Theories and Approaches	3	0	3	3
	TOTAL	16	4	18	30

VI. SEMESTER COURSES (One of the marked courses will be selected)

OMÖ3016 FUNCTIONS OF A COMPLEX VARIABLE-II (2-2-3)

Power series, properties of analytic functions, inverse function, uniqueness theorem, analytic continuation. Laurent series and classification of singular points. Multi-valued analytic functions, analytic branch, branch points, Riemann surfaces. Residue theorem and its applications, calculation of definite real integrals using residues. Argument principle and Rouche's Theorem. Meromorphic functions, fractional linear transformations.

OMÖ3018 TOPOLOGY-II (3-0-3)

Product and quotient spaces (product space, product of topological spaces family, quotient spaces). Countability properties (first countable spaces, second countable spaces, separable spaces, Lindelöf spaces and their relationships with each other). Convergence (convergence of sequences, convergence and continuity). Separation axioms, compact spaces, connected spaces.

OMÖ3020 NUMERICAL ANALYSIS (4-0-4)

What is Numerical Analysis? Errors and computer arithmetic in numerical analysis, algorithms and convergence. Lagrange, Newton, and Hermite interpolation polynomials, interpolation formulas, spline interpolation. Numerical derivative and numerical integral. Some numerical integration formulas. Numerical solutions of linear algebraic equation systems, Gauss Elimination method, Pivoting, Gauss-Jordan Method. Iteration methods, Jacobi iteration, Gauss-Seidel iteration, eigenvalue and eigenvector problem in matrices. Numerical solutions of nonlinear equations and systems of equations, numerical solutions of nonlinear single-variable equations, simple iteration method, secant method, Newton-Raphson method, linear approximation method. Error evaluation for iterative methods, iteration methods for nonlinear systems, simple iteration, Seidel, and Newton methods. Numerical solutions of ordinary differential equations, initial value problems, boundary value problems (Taylor series method, Euler, Runge-Kutta methods, Adams method, multi-step methods, finite difference schemes, shooting method). Numerical solutions of partial differential equations (elliptic, parabolic, and hyperbolic).

OMÖ3026 SCIENTIFIC RESEARCH METHODS (Elective) (2-0-2)

Scientific method and research characteristics, selection of problem and sub-problems, population, sample and determination of sampling, literature review. Data, data collection tools and characteristics, data collection. Main analysis methods applied in educational research, findings, interpretations, and report writing.

OMÖ3028 WEB DESIGN (Elective) (2-0-2)

Introduction to web-based instruction, introduction to HTML language, HTML applications, advanced HTML applications, adaptation of instructional theories to web-based environment. Visual design principles, audio-visual applications, HTML editors, style sheet applications, javascript applications, evaluation of web-based instruction.

OMÖ3030 A COURSE DEEMED APPROPRIATE BY THE DEPARTMENT (Elective) (2-0-2)

OMÖ3022 SPECIAL TEACHING METHODS-II (2-2-3)
What should be the profile of a mathematics teacher? What are the reasons for wanting to be a mathematics teacher? Teacher competencies (pedagogical content knowledge, subject matter knowledge). How to prepare and evaluate a lesson plan? Students will prepare lesson plans; they will list resource materials (such as software, video cassettes, magazines, and books). How should classroom management be? Measurement and evaluation in mathematics lessons, development of measurement tools. Alternative measurement and evaluation tools (rubrics, project evaluation form, problem-solving evaluation form, group work evaluation form, journal writing, oral and written evaluations, standardized tests, portfolios = product files, listening to group discussions, etc.). Performance-based assessment (Students will be subjected to performance-based tests and will evaluate performance-based tests.) Student presentations (Students will teach a secondary education topic to their peers. For this, they will plan the lesson and implement their plans in the classroom.).

OMÖ3014 LEARNING TEACHING THEORIES AND APPROACHES (3-0-3)
Basic concepts (theory, principle, law, method, technique, strategy, tactic, style, manner, model, and approach). Learning theories, teaching theories, explanatory and prescriptive instructional theories, theorists working in the field. Transition from method to strategy, learning strategies, classifications related to learning strategies, teaching strategies, classifications related to teaching strategies. Style-strategy interaction, learning-teaching styles and style-focused instructional design. Examples of strategies that can be used to provide effective instructional service. Approaches such as problem-based learning, project-based learning, story-based learning, scenario-based learning, and example applications based on these approaches.

7th SEMESTER

KODU	COURSE TITLE	T	P	C	ECTS
OMÖ4001	Abstract Algebra	3	0	3	7
OMÖ4031	Probability and Statistics-I	3	0	3	7
OMÖ4019	***Community Service Practices (Elective)**	**1**	**2**	**2**	**2**
OMÖ4023	***** History of Mathematics (Elective)**	**2**	**0**	**2**	**2**
OMÖ4021	***** Literature Review (Selective)**	**2**	**0**	**2**	**2**
OMÖ4015	Classroom Management	2	0	2	2
OMÖ4011	Guidance	3	0	3	3
OMÖ4025	***Problem Solving (Elective)**	**2**	**2**	**3**	**7**
OMÖ4027	***Approaches to Teaching Mathematics (Elective)**	**2**	**2**	**3**	**7**
OMÖ4029	***Mathematical Activities (Elective)**	**2**	**2**	**3**	**7**
	TOTAL	**15(16)**	**4(2)**	**16**	**28**

VII. SEMESTER COURSES (One of the marked courses will be selected)

OMÖ4001 ABSTRACT ALGEBRA (3-0-3)

Theory of integers (divisibility in integers, modular arithmetic). Theory of groups (group definition and examples and properties). Theory of rings (rings and homomorphism, ideals). Modules (modules and homomorphisms, direct sums of modules). Polynomial rings (ring of sequences, ring of formal power and series). Field extensions, algebraic field extensions, field automorphisms.

OMÖ4031 PROBABILITY AND STATISTICS-I (3-0-3)
Sample spaces, sample points and events, permutations, combination, rules of probability, conditional probability, Bayes' theorem. Random variable, probability function, distribution function, expected value and variance of a random variable, compound distributions. Some discrete probability distributions (Bernoulli, binomial, multinomial, geometric, negative binomial, hypergeometric, Poisson, uniform distributions). Some important continuous probability distributions (normal, uniform, exponential, beta distributions). Moment generating functions, characteristic functions, counting, continuous distributions, normal distribution and standard normal distribution.

OMÖ4019 COMMUNITY SERVICE PRACTICES (Elective) (1-2-2)
Importance of community service practices, preparing projects to identify and solve current community problems. Attending scientific events such as panels, conferences, congresses, symposiums as an audience member, speaker, or organizer. Volunteering in various projects within the framework of social responsibility. Gaining basic knowledge and skills for the implementation of community service activities in schools.

OMÖ4023 HISTORY OF MATHEMATICS (Elective) (2-0-2)
The role of mathematics history in mathematics education. Mathematics arising from daily needs, ancient Egyptian and Babylonian mathematics, ancient Greek mathematics (Thales, Pythagoras, Euclid, Archimedes, etc.). 8th-15th century Islamic world mathematicians (Harizmi, Banu Musa, Omar Khayyam, Al Biruni, etc.). Rising light from the East (Ulugh Beg, Kadızade, Ali Kuşçu). The birth of modern mathematics.

OMÖ4021 LITERATURE REVIEW (Elective) (2-0-2)
Performing literature search, grouping the studies carried out. Reviewing the studies carried out, interpreting the studies carried out and gaining a general idea. Being able to present suggestions for future studies.

OMÖ4015 CLASSROOM MANAGEMENT (2-0-2)
Basic concepts related to classroom management, in-class communication and interaction. Definition of classroom management, differences and features of the classroom management concept from ensuring discipline in the classroom. In-class and out-of-class factors affecting the classroom environment. Classroom management models, developing and applying rules in the classroom, physically arranging the classroom. Management of undesirable behaviors in the classroom, time management in the classroom, classroom organization. Creating a positive classroom environment suitable for learning (examples and suggestions).

OMÖ4011 GUIDANCE (3-0-3)
Basic concepts, student personal services, the place of psychological counseling and guidance within these services. Principles and development of guidance, types of psychological counseling and guidance. Services, techniques, organization and personnel, new developments in the field. Student assessment techniques, guidance counselor-teacher collaboration, guidance duties to be performed by the teacher.

OMÖ4025 PROBLEM SOLVING (Elective) (2-2-3)
What is problem solving? What is mathematical problem solving? Problem solving steps (models), problem solving strategies (finding a pattern, working backward, different point of view, simpler analogy problem, examining extreme cases, drawing (visual representation), clever guess and testing, accounting for all cases, data organization, logical reasoning). Problem solving as a teaching method, research on problem solving, factors affecting problem solving success. Measurement and evaluation in the problem solving process, problem posing, creativity and problem solving (creative problem solving). Metacognition and problem solving, metacognitive techniques.

OMÖ4027 APPROACHES IN MATHEMATICS EDUCATION (Elective) (2-2-3)
Mathematical proof, conceptual and procedural knowledge in Mathematics, metaphors in mathematics lessons. Micro-teaching applications, education of gifted children. Alternative measurement and evaluation techniques that can be used in mathematics classes such as writing, thinking aloud. Factors affecting learning and teaching. Applications of supporting materials that can be used in the classroom such as paper folding-origami-tangramgeoboard, dotted paper, HeMa and similar calculators, technological materials. Identification and education of students with special needs (education of individuals with different learning needs and characteristics, adaptation of existing methods and activities in mathematics lessons to the needs of these individuals, approaches to increase in-class motivation). Examination of how other disciplines and tools can be used in mathematics education, What is motivation? Motivation models.

OMÖ4029 MATHEMATICAL ACTIVITIES (Elective) (2-2-3)
Review of existing worksheets in the literature aimed at teaching basic concepts in mathematics and development of new worksheets. Measurement and evaluation of worksheets. Developing mathematical projects and measurement and evaluation criteria for projects.

8th SEMESTER

CODE	COURSE TITLE	T	P	C	ECTS
OMÖ4004	Computer Programming	2	2	3	7
OMÖ4006	Probability and Statistics-II	3	0	3	7
OMÖ4014	***Differential Geometry (Elective)**	**2**	**2**	**3**	**7**
OMÖ4016	***Applied Mathematics (Elective)**	**2**	**2**	**3**	**7**
OMÖ4018	***Mathematics Software (Elective)**	**2**	**2**	**3**	**7**
OMÖ4010	History of Science	2	0	2	2
OMÖ4012	Subject Area Textbook Review	2	2	3	7
OMÖ4008	Turkish Education System and School Management	2	0	2	2
	TOTAL	13	6	16	32

VIII. SEMESTER (One of the marked courses will be selected)
OMÖ4004 COMPUTER PROGRAMMING (2-2-3)
Concept of programming language, classes of programming languages, concept of algorithm, algorithmic approach to problem solving, use of Visual Basic editor, anatomy of Visual Basic program, components of Visual Basic language, concept and definition of variables, data types, operators (arithmetic, logical, comparison), value assignment, basic input-output commands, conditional structures, loop structures, string commands, numerical operation commands, single and two-dimensional indexed variables, concept of subprogram and types of subprograms in Visual Basic.
OMÖ4006 PROBABILITY AND STATISTICS II (3-0-3)
Sample selection, data definition, organization and analysis of data (measures of central tendency and dispersion), stem-and-leaf plot, histogram, median and quartiles for recognizing distribution, point estimation, definition of estimator (predictor), sampling distribution, confidence intervals, hypothesis testing, linear regression, linear relationship of random variables, correlation, regression analysis.

OMÖ4014 DIFFERENTIAL GEOMETRY (Elective) (2-2-3)
Topological manifolds: basic concepts and some examples. Analysis on manifolds: tangent spaces in Euclidean spaces, directional derivative, cotangent spaces and 1-forms; Lie operators, derivative mapping, submanifolds. Theory of curves: definitions, parameter changes, Serret-Frenet theorems, curvature and torsion of a curve. Manifolds: Riemann manifolds, hypersurfaces, geometry of hypersurfaces. Normal vector field, orientation, geodesics, shape operator, Gauss map and equation, fundamental forms, Euler's Theorem, Dupin indicatrix, Olin-Rodrigues formulas.

OMÖ4016 APPLIED MATHEMATICS (Elective) (2-2-3)
Fourier series: orthogonal function system, trigonometric systems and Fourier series, expansion of functions into Fourier series, properties of Fourier coefficients, sufficient conditions for a function to be expandable into a Fourier series, examples, Fourier series in complex form. Fourier integral and transform: definitions, properties of Fourier integral, sine and cosine Fourier integrals, Fourier transform and properties, examples. Laplace transform: definitions, properties of Laplace transform, examples, decomposition theorems for inverse Laplace transform, convolution, application of Laplace transform to ordinary differential equations with constant coefficients. Mathematical models of some boundary-value problems for partial differential equations: physical interpretations of some boundary-value problems for diffusion and wave equations, Fourier and Laplace methods for partial differential equations.

OMÖ4018 MATHEMATICAL SOFTWARE (Elective) (2-2-3)
General review of mathematical software theory, use of basic mathematical software (Maple, MathCad, Mathematica, MatLab, Maxima), design of mathematical algorithms and procedure development.

OMÖ4010 HISTORY OF SCIENCE (2-0-2)
The evolution of science since ancient Near Eastern civilizations. Science in the Ionian-Hellenic, Islamic-Turkish (Arab, Khorasan, Seljuk, Andalusian, Ottoman) periods. Development of science branches such as Astronomy, Mathematics, Physics, Medicine, Biology, etc., in these periods and in the "West" since the Renaissance. 20thcentury science and technology revolutions.

OMÖ4012 SUBJECT AREA TEXTBOOK REVIEW (2-2-3)
Aims of education, book and textbook, criticism approaches and criticism of textbooks, supplementary instructional materials, book selection and criteria used in book selection, physical properties of the textbook, page layout and typography, designing textbooks, textbooks in other countries, methods and criteria for reviewing various textbooks, examples of book review.

OMÖ4008 TURKISH EDUCATION SYSTEM AND SCHOOL ADMINISTRATION (2-0-2)
Aims and basic principles of the Turkish education system, legal regulations related to education, the structure of the Turkish education system, management theories and processes, school organization and administration, matters related to personnel, student, instruction, and operation in school administration, social participation in the school.

9th SEMESTER

CODE	COURSE TITLE	T	P	C	ECTS
OMÖ5001	***Geometry (Elective)**	**3**	**0**	**3**	**5**
OMÖ5009	***Number Theory (Elective)**	**3**	**0**	**3**	**5**
OMÖ5011	***Mathematical Modeling (Elective)**	**3**	**0**	**3**	**5**
OMÖ5003	Functional Analysis	4	0	4	5
OMÖ5005	School Experience	1	4	3	6
OMÖ5007	Measurement and Evaluation	3	0	3	3
OMÖ5013	*Methods and Techniques in Mathematics Teaching (Elective)	**3**	**0**	**3**	**3**
OMÖ5015	***Mathematical Thinking (Elective)**	**3**	**0**	**3**	**3**
OMÖ5017	***Graphics Software and Animation (Elective) 3**	**3**	**0**	**3**	**3**
	TOTAL	14	4	16	22

IX. SEMESTER (One of the marked courses will be selected)
OMÖ5001 GEOMETRY (Elective) (3-0-3)
Axiomatic systems and their properties, models, finite geometries (four-point, Fano and Young geometries). Axioms for incidence geometry, Euclid geometry and Euclid's "Elements" book. An introduction to modern Euclidean geometry, Hilbert model, Birkoff model, OMÇG Postulates. Non-Euclidean geometries, neutral (absolute) geometry.

OMÖ5009 NUMBER THEORY (Elective) (3-0-3)
Divisibility properties of integers, greatest common divisor, least common multiple, prime numbers. Fundamental theorem of arithmetic, Euler \phi-function, Fermat, Euler and Wilson theorems, properties of Euler \phi-function. Congruences, solution of first-degree congruence equations, Chinese remainder theorem. Solution of n^{th} degree congruences, solution of congruences modulo a prime, quadratic residues, Legendre and Jacobi symbols, quadratic reciprocity theorem.

OMÖ5011 MATHEMATICAL MODELING (Elective) (3-0-3)
What is mathematical modeling? Modeling with data, use of mathematical models, modeling with the aid of theory. Understanding the problem, selecting variables, making assumptions, solving equations, interpretation of the solution and validity of the models, criticism and development of the model. Development of modeling ability: (Modeling problems, simulation modeling, dimensional analysis modeling).

OMÖ5003 FUNCTIONAL ANALYSIS (4-0-4)
Metric spaces (definition and examples, Hölder and Minkowski inequalities, open and closed sets, neighborhoods, convergence, Cauchy sequences and completeness, completion of metric spaces, separable metric spaces). Banach and Hilbert spaces, linear operators, space of bounded linear operators, inverse operators, dual spaces and adjoint operators. Hahn-Banach theorem and its consequences, dual spaces of normed spaces. Adjoint, Hermitian, unitary, and normal operators, strong and weak convergence. Compact sets and compact linear operators, compactness in normed spaces, compactness criteria in some spaces, compact linear operators, compact Hilbert-adjoint operators in Hilbert space, spectrum and resolvent of operators.

OMÖ5005 SCHOOL EXPERIENCE (1-4-3)
Observing a day of the teacher and a student in the school. Observing how the teacher organizes the lesson, divides the lesson into stages, applies instructional methods and techniques, uses activities, manages the lesson, controls the classroom, finishes the lesson, and evaluates student work. Examining the school's organizational structure, the school principal's duty, and the school's relationship with the community. Preparing a portfolio reflecting the school experience studies.

OMÖ5007 MEASUREMENT AND EVALUATION (3-0-3)
The place and importance of measurement and evaluation in education, basic concepts related to measurement and evaluation. Desired qualities in measurement tools (reliability, validity, usability). Measurement tools used in education and their characteristics. Traditional approaches to tools (written exams, short-answer exams, truefalse type tests, multiple-choice tests, matching tests, oral examinations, assignments). Tools aimed at comprehensively knowing the student (observation, interview, performance evaluation, student product portfolio, research papers, research projects, peer evaluation, self-evaluation, attitude scales). Basic statistical operations performed on measurement results, evaluating learning outcomes, grading, developing a measurement tool related to the field.

OMÖ5013 METHODS AND TECHNIQUES IN MATHEMATICS EDUCATION (Elective) (3-0-3)
Cooperative learning in mathematics classes, brain-based learning, learning styles. Investigation of concept images, cognitive conflicts, and concept misconceptions related to fundamental concepts in mathematics. Lesson design using some methods and techniques such as the Van Hiele model.

OMÖ5015 MATHEMATICAL THINKING (Elective) (3-0-3)
What are thinking skills? Foundations and teaching of thinking skills. Creativity and creative thinking skills, intelligence and critical thinking skills. Thinking skills and reading, writing, science, social studies, and the gifted. Thinking skills, standards and evaluation. Psychology of advanced mathematical thinking, advanced mathematical thinking processes. Mathematical creativity, mathematical proof, the role of definitions in teaching and learning mathematics. The role of concept and symbols in the construction of advanced mathematical concepts, reflective abstraction in advanced mathematical thinking.

OMÖ5017 GRAPHIC SOFTWARE AND ANIMATION (Elective) (3-0-3)
What is Graphic communication? What is Graphic design? Design process and principles. History of graphic design; Creativity in graphic design. Basic design elements in graphics (Point, Line, Shape-Form, Form, Texture, Tone, Colors). Application areas of graphic design (typographic communication, graphic symbols, emblem, logo, visual identity design, poster design). Basic Graphic Knowledge (pixel depth, compression, image format selection, resolution). Graphic drawing programs (Photoshop, Fireworks, etc.). Animation concept, frame concept in animation, layer concept in animation, types of animation. Developing small programs using script language in animation, principles of animation use in education.

10th SEMESTER					
CODE	**COURSE TITLE**	**T**	**P**	**C**	**ECTS**
OMÖ5012	***Basic Concepts in Mathematics (Elective)**	**3**	**0**	**3**	**5**
OMÖ5002	***Computer-Aided Mathematics Instruction (Elective)**	**3**	**0**	**3**	**5**
OMÖ5014	*A Course Determined Appropriate by the Department (Elective)	**3**	**0**	**3**	**5**
OMÖ5006	Real Analysis	3	0	3	5
OMÖ5016	*Qualitative Research Techniques (Elective)	**2**	**0**	**2**	**2**
OMÖ5018	***Environment and Human Health (Elective)**	**2**	**0**	**2**	**2**
OMÖ502	***A Course Deemed Appropriate by the Department** (Elective)	**2**	**0**	**2**	**2**
OMÖ5010	Teaching Practice	2	6	5	10
OMÖ5008	Research Project in Field Education	2	2	3	6
	TOTAL	12	8	16	28

X. SEMESTER (One of the marked courses will be selected)

OMÖ5012 BASIC CONCEPTS IN MATHEMATICS (Elective) (3-0-3)

Integer problems, divisibility criteria, simplification of real numbers and algebraic expressions. First-degree equation and inequalities, higher-degree equations, rational inequalities, irrational equation and inequalities, systems of equations, systems of inequalities. Exponential and logarithm equation and inequalities, simplification of trigonometric expressions, inverse trigonometric functions, solution of trigonometric equation, inequality, and system of equations. Arithmetic and geometric sequence problems, equation formation problems. Geometry problems in the plane and in space.

OMÖ5002 COMPUTER-ASSISTED MATHEMATICS INSTRUCTION (Elective) (3-0-3)

Characteristics of various instructional technologies, computer and mathematics. Modeling with computer in mathematics instruction. Software and application programs used in computer instruction, development of instructional material with the aid of instructional technologies, evaluation of various instructional materials.

OMÖ5014 A COURSE DEEMED APPROPRIATE BY THE DEPARTMENT (Elective) (3-0-3)

The course content is to be determined by the department.

OMÖ5006 REAL ANALYSIS (3-0-3)

Countable sets, comparison of infinite sets, topological concepts in \mathbb{R}. Measure theory, inner and outer measures of bounded sets, measurable sets, measurable functions and some simple properties. Different types of convergence, Lebesgue integral and its properties, comparison of Lebesgue and Riemann integrals, summable functions, Stieltjes integral, absolutely continuous functions and Lebesgue indefinite integral.

OMÖ5016 QUALITATIVE RESEARCH TECHNIQUES (Elective) (2-0-2)

Qualitative research designs, qualitative research process, sampling in qualitative research. Interview, focus group interview, observation, document analysis, data collection, data analysis. Validity, reliability, case study, action research, phenomenology, grounded theory.

OMÖ5018 ENVIRONMENT AND HUMAN HEALTH (Elective) (2-0-2)
Effects of air, water, soil, and food pollution on human health. Chemical wastes and human health, global warming and its effects on health, depletion of the ozone layer and human health. Current environmental problems (noise pollution, traffic accidents, electromagnetic fields, etc.) and their effects on human health.

OMÖ5020 A COURSE DEEMED APPROPRIATE BY THE DEPARTMENT (Elective) (2-0-2)
The course content is to be determined by the department.

OMÖ5010 TEACHING PRACTICE (2-6-5)
Preparing a daily plan every week. Implementing the prepared plan at the application school. Evaluation of the implementation by the teacher in the school, faculty member, and practice student. Making corrections in line with the evaluations and re-implementing. Preparing a portfolio reflecting the application studies.

OMÖ5008 RESEARCH PROJECT IN FIELD EDUCATION (2-2-3)
Conducting research on a selected topic related to Mathematics Education under the supervision of the course instructor throughout one semester. Research is conducted in line with the suggestions provided in the theoretical part of this course, and the results are presented as a report.
This concludes the translation for the 10th Semester. Would you like me to translate the annual graduation course as well, or is this all the information you need?

ANNUAL COURSES TO BE GIVEN IN THE 9TH-10TH SEMESTER

CODE	**COURSE TITLE**	**T**	P	C	ECTS
OMÖ5000	Graduation Project/Thesis	0	4	2	10

OMÖ5000 GRADUATION PROJECT/THESIS (0-4-2)
Preparation and presentation of a thesis on a topic selected by the student related to Mathematics/Mathematics Education in accordance with thesis rules under the mentorship of the course instructor.