T.C.

SİVAS CUMHURİYET UNIVERSITY

FACULTY of EDUCATION

ELEMENTARY MATHEMATICS EDUCATION UNDERGRADUATE PROGRAM

SİVAS, 2022

ELEMENTARY MATHEMATICS EDUCATION UNDERGRADUATE PROGRAM

1ST SEMESTER							2ND SEMESTER					
CODE	**COURSE TITLE**	**T**	**U**	**K**	**A**		**CODE**	**COURSE TITLE**	**T**	**U**	**K**	**A**
MB	Introductionto Education	2	0	2	3		MB	Educational Psychology	2	0	2	3
MB	Philosophy of Education	2	0	2	3		MB	Sociology of Education	2	0	2	3
GK	Turkish Language 1	2	0	2	3		GK	Turkish Language 2	2	0	2	3
GK	Foreign Language 1	2	0	2	3		GK	Foreign Language 2	2	0	2	3
GK	Atatürk's Principles and History of Reforms 1	2	0	2	3		GK	Atatürk's Principles and History of Reforms 2	2	0	2	3
GK	Career Planning and Development	1	0	1	2		GK	Non-Core Elective Course 1	2	0	0	0
AE	Analysis 1	2	2	3	5		AE	Analysis 2	2	2	3	5
AE	Abstract Mathematics 1	2	0	2	4		AE	Abstract Mathematics 2	2	0	2	5
AE	Foundations of Mathematics 1	2	0	2	4		AE	Foundations of Mathematics 2	2	0	2	5
	Total	17	2	18	30			**Total**	18	2	17	30

3RD SEMESTER							4TH SEMESTER					
CODE	**COURSE TITLE**	**T**	**U**	**K**	**A**		**CODE**	**COURSE TITLE**	**T**	**U**	**K**	**A**
MB	School Experience 1	1	4	3	8		MB	Turkish Education System and School Administration	2	0	2	3
MB	Principles and Methods of Teaching	2	0	2	3		MB	Elective 2	2	0	2	3
MB	Elective 1	2	0	2	3		GK	Non-Core Elective Course 2	2	0	0	0
GK	Elective 1	2	0	2	3		AE	Linear Algebra 2	3	0	3	5
AE	Analysis 3	3	0	3	3		AE	Analytic Geometry 2	3	0	3	5
AE	Linear Algebra 1	3	0	3	3		AE	Differential Equations	2	2	3	5
AE	Analytic Geometry 1	3	0	3	3		AE	Problem Solving Instruction	2	0	2	4
AE	Mathematics Learning and Teaching Approaches	2	0	2	2		AE	Middle School Mathematics Curriculum	2	0	2	3
AE	Elective 1	2	0	2	2		AE	Elective 2	2	0	2	2
	Total	20	4	22	30			**Total**	20	2	19	30

5TH SEMESTER							6TH SEMESTER					
CODE	**COURE TITLE**	**T**	**U**	**K**	**A**		**CODE**	**COURSE TITLE**	**T**	**U**	**K**	**A**
MB	Special Education and Integration	3	0	3	4		MB	School Experience 2	1	4	3	8
MB	Classroom Management	2	0	2	3		MB	Assessment and Evaluation	3	0	3	4
MB	Elective 3	2	0	2	3		MB	Elective 4	2	0	2	3
GK	Community Service Practices	1	2	2	3		GK	Elective 2	2	0	2	3
AE	Probability	3	0	3	4		AE	Statistics	3	0	3	3
AE	Algebra	3	0	3	4		AE	Geometry	3	0	3	3
AE	Computer-Aided Mathematics Instruction	2	0	2	3		AE	Material Design in Mathematics Instruction	2	0	2	2
AE	Teaching of Numbers	3	0	3	4		AE	Algebra Instruction	3	0	3	3
AE	Elective 3	2	0	2	2		AE	Elective 4	2	0	2	2
	Total	21	2	22	30			**Total**	21	4	23	31

7TH SEMESTER							8TH SEMESTER					
CODE	**COURSE TITLE**	**T**	**U**	**K**	**A**		**CODE**	**COURSE TITLE**	**T**	**U**	**K**	**A**
MB	Teaching Practice 1	2	6	5	10		MB	Teaching Practice 2	2	6	5	10
MB	Research Methods in Education	2	0	2	3		MB	Guidance in Schools	2	0	2	3
GK	Elective 3	2	0	2	3		GK	Elective 4	2	0	2	3
AE	Geometry and Measurement Instructions	3	0	3	7		AE	Probability and Statistics Instruction	3	0	3	7
AE	History of Mathematics	2	0	2	5		AE	Philosophy of Mathematics	2	0	2	5
AE	Elective 5	2	0	2	2		AE	Elective 6	2	0	2	2
	Total	13	6	16	30			**Total**	13	6	16	30

Fields	**T**	**U**	**K**	**AKTS**	**TOTAL HOURS**	**PERCENTAGE**
Vocational Knowledge (VK)	38	20	48	83	58	34
General Culture (GC)	26	2	23	35	28	16
Fields Education (FE)	79	6	82	123	85	50
Total	**143**	**28**	**153**	**241**	**171**	**100**

ELECTIVE COURSES (T-U-K-A)

VOCATIONAL KNOWLEDGE ELECTIVE COURSES (2-0-2-3)

- Open and Distance Learning
- Collaboration and Communication with Families
- Co-Teaching (or Collaborative Teaching)
- Child Psychology
- Textbook Analysis (or Textbook Review)
- Attention Deficit and Hyperactivity Disorder (ADHD)
- Speech and Language Disorders
- Educational Anthropology
- Education Law
- History of Education
- Morality and Ethics in Education
- Digital Content Development in Education
- Drama in Education
- Extracurricular Activities in Education
- Curriculum Development in Education
- Project Preparation in Education
- Critical and Analytical Thinking
- Education of Hospitalized Children
- Inclusive Education
- Character and Value Education
- Comparative Education
- Microteaching
- Museum Education
- Out-of-School Learning Environments
- Learning Disability
- Individualizing and Adapting Instruction
- Sustainable Development and Education
- History of Turkish Education
- Adult Education and Lifelong Learning

GENERAL CULTURE ELECTIVE COURSES (2-0-2-3)

- Addiction and Combating Addiction
- Nutrition and Health
- History and Philosophy of Science
- Science and Research Ethics
- Children's Rights and Protection
- World Musics (or World Music)
- Economy and Entrepreneurship
- Traditional Turkish Handicrafts
- General Geography
- Semiotics
- Human Rights and Democracy Education
- Human Relations and Communication
- Use of Internet Technologies
- Culture and Language
- Media Literacy
- Art and Aesthetics
- Sound Recording Methods
- Basic Information Technologies
- Basic English
- Turkish Folk Dances
- Turkish Sign Language
- Turkish Cultural Geography
- Turkish Cultural History
- Turkish Music
- Turkish Art History
- Geography of Turkey
- History of Civilization
- Three-Dimensional Design (3D Design)
- Geography of Countries

FIELD EDUCATION ELECTIVE COURSES (2-0-2-2)

- Discrete Mathematics
- Mathematics Instruction in Elementary School
- Complex Analysis
- Mathematical Olympiad Problems
- Field Research Project in Mathematics Instruction
- Algorithm and Programming in Mathematics Instruction
- Drama in Mathematics Instruction
- Activity Development in Mathematics Instruction
- Communication in Mathematics Instruction
- Connections in Mathematics Instruction
- Conceptual Misconceptions in Mathematics Instruction
- Logical Reasoning in Mathematics Instruction
- Microteaching in Mathematics Instruction
- Modeling in Mathematics Instruction
- Out-of-School Learning Environments in Mathematics Instruction
- Learning Disability in Mathematics Instruction
- STEM Approach Applications in Mathematics Instruction
- Mathematics and Art
- Numerical Analysis
- Game Theory
- Teaching Mathematics through Play
- Non-Euclidean Geometries
- Number Theory
- Teaching Mathematics to Gifted Students

COURSE DESCRIPTIONS of the UNDERGRADUATE PROGRAM in ELEMENTARY MATHEMATICS EDUCATION

1ST SEMESTER

CODE	COURSE TITLE	T	U	K	A
MB	Introduction to Education	2	0	2	3
MB	Philosophy of Education	2	0	2	3
GK	Turkish Language 1	2	0	2	3
GK	Foreign Language 1	2	0	2	3
GK	Atatürk's Principles and History of Reforms 1	2	0	2	3
GK	Career Planning and Development	1	0	1	2
AE	Analysis 1	2	2	3	5
AE	Abstract Mathematics 1	2	0	2	4
AE	Foundations of Mathematics 1	2	0	2	4
	Total	17	2	18	30

MB Introduction to Education (2-0-2-3)

Fundamental concepts related to education and instruction; aims and functions of education; the relationship of education with other fields and sciences; legal, social, cultural, historical, political, economic, philosophical, and psychological foundations of education; methodology in educational sciences; school and classroom as an educational and learning environment; the teaching profession and current developments in teacher training; and trends related to education in the twenty-first century.

MB Philosophy of Education (2-0-2-3)

Fundamental subjects and problem areas of philosophy; ontology (being), epistemology (knowledge), ethics/axiology (values) philosophy, and education; basic philosophical movements (idealism, realism, naturalism, empiricism, rationalism, pragmatism, existentialism, analytic philosophy) and education; educational philosophy and educational movements: Perennialism, Essentialism, Progressivism, Existentialist Education, Critical/Radical Education; educational views of some philosophers in the Islamic world and the West (Plato, Aristotle, Socrates, J. Dewey, Avicenna (Ibn-i Sina), Al-Farabi, J. J. Rousseau, etc.); human nature, individual differences, and education; education from the perspective of some political and economic ideologies; intellectual movements and education effective in Turkey during the modernization process; philosophical foundations of the Turkish education system.

GK Turkish Language 1 (2-0-2-3)

Basic characteristics of written language and written communication, fundamental differences between written and spoken language. Expression: written and oral expression; subjective expression, objective expression; the paragraph, types of paragraphs (introductory, body, and concluding paragraphs). Definition of the text and types of texts (informative texts, literary texts); conditions for textuality (cohesion, coherence, intentionality, acceptability, situationality, informativity, intertextuality). Written expression (written composition: free writing, planned writing); stages of planned writing (subject, delimitation of the subject, 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, minutes, report, official documents, scientific writings); studies on examples and writing practices; summarizing and outlining a text; correcting language and expression errors in written applications.

GK Foreign Language 1 (2-0-2-3)

Present tense; simple present tense, speaking, reading, writing, and listening skills in these tenses; speaking skills (introducing oneself, being able to describe something/a place, giving directions, question and answer patterns for personal information); reading skills (reading lists/labels, asking questions, etc. in restaurants, on transport vehicles like buses/trains, and at shopping locations); writing skills (writing short messages, writing poster content, filling out forms); listening skills (directions, place/person descriptions, etc.).

GK	Atatürk’s Principles and History of Reforms 1 (2-0-2-3)
Internal and external reasons leading to the collapse of the Ottoman Empire; reform movements in the Ottoman Empire during the 19th century; intellectual currents in the late Ottoman period; the political and military situation of the Ottoman Empire at the beginning of the 20th century; World War I and the Armenian Question; the occupation of Anatolia and the reactions; Mustafa Kemal Pasha's landing in Samsun and his activities; the period of congresses and organization; the opening of the last Ottoman Parliament (Meclis-i Mebusan) and the adoption of the National Pact (Misak-ı Millî); preparations for the National Struggle and the material and moral foundations of these preparations; the opening of the Turkish Grand National Assembly (TBMM) and its activities; the Treaty of Sèvres; struggles on the Southern and Eastern fronts; the establishment of the regular army, the Greek offensive and the wars on the Western front, the signing of the Armistice of Mudanya, the convening of the Lausanne Conference, and the signing of the Peace Treaty.	
GK	**Career Planning and Development (1-0-1-2)**
The concept of career, career planning and its stages; individual career development, creating a career strategy; the career planning model, career options in related teaching fields; résumé preparation and types of résumés, CV format and examples, points to consider when preparing a CV; cover letters, letters of introduction, the job interview, its purposes, methods, and types, preparation for the interview and interview stages; situations that may be encountered in interviews; question types, body language-physical signals.	
AE	**Analysis 1 (2-2-3-5)**
Sets. The axiomatic construction of rational, irrational, and real numbers. Sets of real numbers. Supremum and infimum of real number sets, the completeness axiom, and the Dedekind cut. Operations on the set of real numbers, the Nested Intervals Theorem. Function definition, basic concepts and properties related to functions, examples related to the topic. Trigonometric functions, trigonometric relations, and solutions to trigonometric equations. Complex numbers and their properties. Sequences of real numbers, limit of sequences, properties of convergent sequences, bounded and monotonic sequences, Bolzano-Weierstrass Theorem, limit point of a sequence, concepts of upper and lower limits for a sequence, Cauchy sequence. Limit of functions, right-hand and left-hand limits. Limit of a composite function, conditions for the existence of a limit, Cauchy criterion. Infinitesimal and infinitely large functions. Continuity of functions, local and global properties of continuous functions, Bolzano-Cauchy, Intermediate Value, and Weierstrass theorems. Derivative and differential, rules of differentiation. Higher-order derivative and differential, fundamental theorems for differentiable functions. Taylor's formula and L’Hospital's rule. Examination of functions using the derivative, curve sketching.	
AE	**Abstract Mathematics 1 (2-0-2-4)**
Propositional algebra. Mathematical proof. Quantifiers. Concept of sets and algebra of sets. Families of sets. Cartesian products (or Product sets). Functions. Relations. Equivalence relations. Partially ordered sets. Totally ordered sets (or Linearly ordered sets). Order-preserving functions. Order isomorphisms (or Order-preserving transformations). Lattices.	
AE	**Foundations of Mathematics 1 (2-0-2-4)**
Fundamental concepts and properties related to the topics in the Numbers and Algebra learning domains of the mathematics curriculum (natural numbers, operations with natural numbers, fractions, operations with fractions, decimal representation, percentages, factors and multiples, sets, integers, operations with integers, rational numbers, operations with rational numbers, ratio, ratio and proportion, exponential expressions, square root expressions, algebraic expressions, equality and equation, linear equations, algebraic expressions and identities, inequalities); the relationship between these concepts, the discussion of mathematical concepts, and their conversion to one another using multiple representations.	

2ND SEMESTER					
CODE	**COURSE TITLE**	**T**	**U**	**K**	**A**
MB	Educational Psychology	2	0	2	3
MB	Sociology of Education	2	0	2	3
GK	Turkish Language 2	2	0	2	3
GK	Foreign Language 2	2	0	2	3
GK	Atatürk's Principles and History of Reforms 2	2	0	2	3
GK	Non-Core Elective Course 1	2	0	0	0
AE	Analysis 2	2	2	3	5
AE	Abstract Mathematics 2	2	0	2	5
AE	Foundations of Mathematics 2	2	0	2	5
	Total	18	2	17	30

MB Educational Psychology (2-0-2-3)

Fundamental concepts of psychology and educational psychology; research methods in educational psychology; development theories, developmental domains, and developmental processes; individual differences in development; basic concepts related to learning; factors affecting learning; learning theories within the framework of teaching-learning processes; motivation in the learning process.

MB Sociology of Education (2-0-2-3)

Fundamental concepts of sociology: Society, social structure, social fact, social event, etc.; pioneers of sociology (Ibn Khaldun, A. Comte, K. Marx, E. Durkheim, M. Weber, etc.) and their educational views; education in terms of basic sociological theories (functionalism, structuralism, symbolic interactionism, conflict theory, critical theory, phenomenology, and ethnomethodology); social processes (socialization, social stratification, social mobility, social change, etc.) and education; social institutions (family, religion, economy, politics) and education; the development of sociology and sociology of education in Turkey (ZiyaGökalp, İsmail Hakkı Baltacıoğlu, Nurettin Topçu, Mümtaz Turhan, etc.); culture and education; the school as a social, cultural, and moral system and community.

GK Turkish Language 2 (2-0-2-3)

Basic characteristics of spoken language and oral communication. Oral expression; fundamental characteristics of speaking skills (using natural language and body language); basic principles of effective speaking; fundamental characteristics of a good speaker (stress, intonation, pausing; diction, etc.). Impromptu and prepared speaking; stages of prepared speaking (topic selection and delimitation; determining purpose, point of view, main and supporting ideas, planning, writing the text; presentation of the speech). Types of speeches I: (conversations/dialogues, interview/chat, introducing oneself, answering questions, celebrating an important event such as New Year's, birthday, holiday, giving directions, telephone conversations, applying for a job, interviewing someone/conducting an interview, radio and television speeches, participating as a speaker in various culture and arts programs, etc.). Delivering impromptu speeches on various topics, working on speech examples and oral expression practices,
correcting language and expression errors in speeches.

GK Foreign Language 2 (2-0-2-3)

Past tense; future tense; modals (can, could, may, must, etc.); speaking, reading, writing, and listening skills in these tenses and modals; speaking skills (asking questions, ordering food, etc., in diners and restaurants); reading skills (internet weather reports, recipes, flyer/poster texts, etc.); writing skills (writing short messages, giving written directions, writing emails/invitations, etc.); listening skills (weather reports, recipes, etc.).

GK Atatürk's Principles and History of Reforms 2 (2-0-2-3)

Reforms in the political field (Abolition of the Sultanate, proclamation of the Republic, abolition of the Caliphate, etc.); reforms in the social field (Hat Reform, closure of dervish lodges and tombs (tekke and zaviye), Calendar, Clock, and Surname Law); reforms realized in the field of education and culture (Law on the Unification of Education (Tevhid-i Tedrisat), Alphabet Reform, Turkish History and Language Reforms); reforms in the field of law; attempts to transition to a multi-party system during the Atatürk era and the reactions (establishment and closure of the Progressive Republican Party, the Sheikh Said Rebellion, and the assassination attempt on Atatürk); attempts to transition to a multi-party political life during the Atatürk era (establishment and closure of the Liberal Republican Party, and the Menemen Incident); Turkey's economic resources and policy during the Republican period (Izmir Economic Congress); Turkish foreign policy during the Atatürk era (Population Exchange, membership in the League of Nations, Balkan Entente and Saadabad Pact); Turkish foreign policy during the Atatürk era (Montreux Straits Convention, the annexation of Hatay to the Motherland, Turkey's bilateral relations with other countries); definition and scope of Atatürk's ideological system, and Atatürk's Principles; Turkey after Atatürk, the years of the Democratic Party's rule, Turkey in the 1960s and 1970s, Turkey's foreign policy after 1960.

GK	Non-Core Elective Course 1 (2-0-0-0)
It encompasses the course selected by the students and the corresponding course content, as determined by the Rectorship of Sivas Cumhuriyet University.	
AE	**Analysis 2 (2-2-3-5)**
Antiderivative (or Primitive function), indefinite integral and its basic properties. Integration methods. Integration of rational, irrational, trigonometric, and hyperbolic functions. Definite integral in the sense of Riemann: definition, properties of the definite integral. Classes of integrable functions. Fundamental theorems of integral calculus, calculation and applications of the definite integral. Area calculation, arc length calculation. Areas of surfaces of revolution, volumes of solids of revolution. Series, properties of convergent series. Properties of non-negative series and various convergence criteria. Absolutely and conditionally convergent series, Abel's and Dirichlet's criteria. Sequences of functions and their properties, uniform convergence of series of functions. Power series, radius of convergence. Abel's Lemma, Taylor series. Generalized integrals (or Improper integrals), convergence criteria.	
AE	**Abstract Mathematics 2 (2-0-2-5)**
Well-ordered sets. The Axiom of Choice. Hausdorff maximal principle (or Hausdorff maximum principle), Zorn's Lemma, the Well-ordering Theorem. Binary operation. Groups. Rings. Natural numbers. Integers. Rational numbers. Real numbers. Concept of equipotence (or equinumerosity). Finite sets. Infinite sets.	
AE	**Foundations of Mathematics 2 (2-0-2-5)**
Fundamental concepts and properties related to the topics in the Geometry, Statistics, and Probability learning domains of the mathematics curriculum (basic geometric concepts and drawings, triangles and quadrilaterals, triangles, length and time measurement, area measurement, geometric solids, angles, lines and angles, circle, circle and disk, liquid measurement, transformational geometry, polygons, different views of solids, congruence and similarity, data collection and evaluation, data analysis, probability of simple events); the relationship between these concepts, the discussion of mathematical concepts, and their conversion to one another using multiple representations.	

3RD SEMESTER					
CODE	**COURSE TITLE**	**T**	**U**	**K**	**A**
MB	School Experience 1	1	4	3	8
MB	Principles and Methods of Teaching	2	0	2	3
MB	Elective 1	2	0	2	3
GK	Elective 1	2	0	2	3
AE	Analysis 3	3	0	3	3
AE	Linear Algebra 1	3	0	3	3
AE	Analytical Geometry 1	3	0	3	3
AE	Mathematics Learning and Teaching Approaches	2	0	2	2
AE	Elective 1	2	0	2	2
	Total	20	4	22	30

MB School Experience 1 (1-4-3-8)

Recognition of school management and instructional organization through a systematic approach, school administration, activities regularly conducted in schools, recognition of the school's facilities/resources, observation of activities, appropriate reporting, making observations and gaining experience.

MB Principles and Methods of Teaching (2-0-2-3)

Fundamental concepts related to instructional principles and methods; teaching-learning principles, models, strategies, methods, and techniques; setting goals and objectives in instruction; content selection and organization in teaching and learning; instructional materials; planning of instruction and instructional plans; theories and approaches related to instruction; instruction, learning, and achievement in the effective school; assessment of in-class learning.

AE Analysis 3 (3-0-3-3)

Topology of Rn space. Limits and continuity of functions of several variables. Derivatives of functions of several variables. 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 the differential. Sequences and series of transformations. Implicit functions, dependency of functions. Surfaces in Rn Extrema with constraints (or Conditional extrema). Scalar and vector fields.

AE Linear Algebra 1 (3-0-3-3)

Fields. Systems of Linear Equations, Elementary Operations (or Simple Transformations). Matrices (or Matrix Theory). Row-Reduced Echelon Matrix. Matrix Multiplication. Invertible Matrices. Determinants. Permutations and the Uniqueness of Determinants. Elementary Matrix Operations and the Rank of a Matrix. Homogeneous and Non-Homogeneous Linear Systems. Cramer's Rule. Vector Spaces. Subspaces. Basis and Dimension. Coordinates. Linear Transformations

AE Analytical Geometry 1 (3-0-3-3)

Systems of linear equations. Matrices. Solution of systems of linear equations using matrices. Determinant. Rectangular coordinates in the plane (or Cartesian coordinates). Parallel coordinates. Polar coordinates. Rectangular coordinates in space (or Cartesian coordinates in space). Vectors. Coordinate transformations in the plane. Translations. Rotations. Translation-rotations, rotation-translations. Affine transformations in the plane. Symmetry in the plane.

AE Mathematics Learning and Teaching Approaches (2-0-2-2)

The nature of mathematics and mathematical thinking, the meaning of learning and teaching mathematics, the aim and fundamental principles of mathematics instruction, the history of mathematics instruction, reflections of learning and teaching approaches on mathematics instruction, essential skills in mathematics instruction, in-class application examples, current trends in mathematics instruction, components of effective mathematics instruction, and viewing mathematics instruction from socio-cultural-economic perspectives.

4TH SEMESTER					
CODE	**COURSE TITLE**	**T**	**U**	**K**	**A**
MB	Turkish Education System and School Administration	2	0	2	3
MB	Elective 2	2	0	2	3
GK	Non-Core Elective Course 2	2	0	0	0
AE	Linear Algebra 2	3	0	3	5
AE	Analytical Geometry 2	3	0	3	5
AE	Differential Equations	2	2	3	5
AE	Problem Solving Instruction	2	0	2	4
AE	Middle School Mathematics Curriculum	2	0	2	3
AE	Elective 2	2	0	2	2
	Total	20	2	19	30

MB Turkish Education System and School Administration (2-0-2-3)

The formation of education systems and the structure of the Turkish education system; basic laws regulating the Turkish education system; the central, provincial, and overseas organization of the Ministry of National Education; instructional levels in the Turkish education system; human resources, physical, technological, and financial resources in the Turkish education system; reform and innovation initiatives in the Turkish education system; organization-management theories and processes; the school as a social system and organization; human resource management; student personnel affairs; affairs related to education and instruction; affairs related to school management (operatorship); school, environment, community, and family relations; current discussions and trends related to the Turkish education system and schools.

GK Non-Core Elective Course 2 (2-0-0-0)

It encompasses the course selected by the students and the corresponding course content, as determined by the Rectorship of Sivas Cumhuriyet University.

AE Linear Algebra 2 (3-0-3-5)

Polynomials. Invariant Subspaces, Eigenvectors and Eigenvalues. Triangular Forms. Nilpotent Operators. Jordan Canonical Form (or Jordan Standard Form). Polynomials of Matrices and Linear Operators. Minimal Polynomials. Inner Product Spaces. Orthogonality. Gram-Schmidt Orthogonalization Process (or Method). Linear Operators and Functions in Inner Product Spaces. Unitary Operators. Commuting Linear Operators. Normal Operators. Orthogonal Projections. Spectral Theory. Positive Operators. Polar Decomposition. Bilinear Forms. Symmetric and Anti-symmetric Bilinear Forms (or Skew-symmetric Bilinear Forms).

AE Analytical Geometry 2 (3-0-3-5)

Plane curves and some examples of plane curves. Conics. Classification of second-degree plane curves. Lines and planes in space. Symmetry in space. Surfaces. Sphere, cylinder, and cone. Coordinate transformations in space. Classification of second-degree surfaces. Curves in space.

AE Differential Equations (2-2-3-5)

The concept of the derivative, the classification of differential equations, initial-value problems, and genera solutions. Separable equations. Homogeneous equations, equations that can be converted to homogeneous form. Exact differential equations. Integrating factor and equations that can be converted to exact differential equations. Applications of differential equations. First-order linear differential equations. Bernoulli type differential equations. Riccati type differential equations. Equations solvable for the first derivative, envelopes; the C-discriminant. The envelope in a differential equation; the P-discriminant, equations solvable for the dependent variable. Equations solvable for the independent variable, the Clairaut differential equation, the Lagrange differential equation. Orthogonal trajectories, non-orthogona trajectories. Higher-degree first-order equations. Existence and uniqueness theorems. Second-order differential equations. Introduction to the theory of higher-order differential equations. Introduction to the theory of homogeneous linear ordinary differential equations with constant coefficients. Solution of differential equations with series.

AE	Problem Solving Instruction (2-0-2-4)
Problem and problem solving, types of problems, the importance of teaching problem solving, recent developments related to problem solving, mathematical problem-solving strategies, and the importance of multiple representations in problem solving; examples of problems that can be solved with different problem-solving strategies, assessment of problem solving; the definition, process, characteristics, and importance of problem posing, classifications of problem posing, problem posing strategies, conducting different problem posing activities; problem posing in the middle school mathematics curriculum and textbooks; assessment of problem posing, and the design and implementation of problem-solving activities.	
AE	**Middle School Mathematics Curriculum (2-0-2-3)**
To recognize the fundamental concepts related to middle school mathematics curricula; to learn the basic components, approach, content, and skills the middle school mathematics curriculum aims to develop; the distribution of the middle school mathematics curriculum outcomes by grades and its relationship with other subjects; and to learn the fundamental features of the middle school mathematics curriculum such as learning and sub-learning domains, instructional strategy, method, technique, and measurement and evaluation approach.	

5TH SEMESTER					
CODE	**COURSE TITLE**	**T**	**U**	**K**	**A**
MB	Special Education and Integration	3	0	3	4
MB	Classroom Management	2	0	2	3
MB	Elective 3	2	0	2	3
GK	Community Service Practices	1	2	2	3
AE	Probability	3	0	3	4
AE	Algebra	3	0	3	4
AE	Computer-Aided Mathematics Instruction	2	0	2	3
AE	Teaching of Numbers	3	0	3	4
AE	Elective 3	2	0	2	2
	Total	21	2	22	30

MB Special Education and Integration (3-0-3-4)

Fundamental concepts related to special education, principles and historical development of special education; legal regulations regarding special education; special needs groups and their characteristics (speech and language disorders, attention deficit and hyperactivity disorder, intellectual disability, learning disability, emotional and behavioral disorders, visual impairment, hearing impairment, autism spectrum disorder, physical and health-related disabilities, gifted individuals, disadvantaged groups); educational diagnosis and assessment process, supportive special education services, inclusive education model in special education, preparing and implementing the Individualized Education Program (IEP), individualizing instruction and adaptations, supporting language and speech skills, naturalistic teaching strategies, collaboration and communication with families, effective strategies in classroom management and behavior management, teamwork and collaboration.

MB Classroom Management (2-0-2-3)

Fundamental concepts related to classroom management; physical, social, and psychological dimensions of the classroom; classroom rules and discipline; models related to classroom discipline and management; management of student behavior in the classroom, communication and interaction process in the classroom; student motivation in the classroom; time management in the classroom; the teacher as an instructional leader in the classroom; management of teacher-parent meetings; creation of a positive classroom and learning climate; case studies related to classroom management according to school levels.

GK Community Service Practices (1-2-2-3)

Concepts of society, community service practices, and social responsibility; social responsibility projects in terms of societal and cultural values; identification of current societal problems; preparing projects aimed at solving identified societal problems; volunteering in social responsibility projects individually and as a group; participating in social responsibility projects in various institutions and organizations; participating in scientific events such as panels, conferences, congresses, and symposiums as an audience member, speaker, or organizer; evaluating the results of social responsibility projects.

AE Probability (3-0-3-4)

The fundamental principle of counting. Permutation and combination. The Binomial Theorem. Fundamental concepts related to probability, Conditional probability, Bayes' Theorem. Geometric probability problems. Random variable: Definition of a random variable. Probability function, distribution function. Expected value and variance of a random variable. Moment generating functions and moments. Joint distributions. Some discrete distributions. Some continuous distributions. Normal distribution. Standard normal distribution.

AE Algebra (3-0-3-4)

Group definition, examples of groups, Group axioms, Subgroups, Cyclic subgroups, Lagrange's Theorem, Normal subgroups. Homomorphism, isomorphism definitions and examples, homomorphism theorems. Symmetric groups, Abelian groups. General exercises. Rings, Fields.

AE	Computer-Aided Mathematics Instruction (2-0-2-3)
Fundamental concepts (CBI, CBT, CBMI, etc.), terms and explanations related to the use of computers in education, aims of CBI, advantages of CBI, limitations of CBI, recognition of the Geogebra software interface, use of Geogebra software (Geometry), use of Geogebra software (Mathematics), use of Geogebra software (Probability and Statistics), use of Geogebra software (3D Geometry), use of Geogebra software (Algorithm and programming), and sample applications related to CBMI.	
AE	**Teaching of Numbers (3-0-3-4)**
Instruction of the topics: constructing number systems, natural numbers, operations with natural numbers, and numbers in different bases. Instruction of the topics: Integers and Operations with Integers. Instruction of the topics: factors and multiples, divisibility rules, LCM (Least Common Multiple) and GCD (Greatest Common Divisor) concepts and applications. Instruction of the topics: ratio and proportion concepts and applications. Instruction of the topics: Real numbers, exponential and radical quantities. Instruction of fractions. Instruction of operations with fractions. Instruction of decimal representations. Instruction of the topics: percentages, rational and irrational numbers. Instruction of the topics: sets and fundamental concepts related to sets. Student knowledge regarding these topics (understanding and interpreting student thinking about concepts, identifying student difficulties, errors, and misconceptions, and the relationship of these topics with daily life and other subjects).	

6TH SEMESTER					
CODE	**COURSE TITLE**	**T**	**U**	**K**	**A**
MB	School Experience 2	1	4	3	8
MB	Assessment and Evaluation	3	0	3	4
MB	Elective 4	2	0	2	3
GK	Elective 2	2	0	2	3
AE	Statistics	3	0	3	3
AE	Geometry	3	0	3	3
AE	Material Design in Mathematics Instruction	2	0	2	2
AE	Algebra Instruction	3	0	3	3
AE	Elective 4	2	0	2	2
	Total	21	4	23	31

MB School Experience 2 (1-4-3-8)

Recognition of school management and instructional organization through a systematic approach; school administration, activities regularly conducted in schools; recognition of the school's facilities/resources; observation of activities during lessons; appropriate reporting; making observations and gaining experience.

MB Assessment and Evaluation (3-0-3-4)

The place and importance of measurement and evaluation in education, fundamental concepts in measurement and evaluation, measurement tools used in education and their characteristics, measurement tools based on traditional approaches (written exams, short-answer exams, true-false tests, multiple-choice tests, matching tests, oral examinations, assignments), types of evaluation and tools for comprehensively recognizing the student (observation, interview, performance assessment, student product file (portfolio), research papers, research projects, peer assessment, self-assessment, attitude scales), psychometric properties of measurement tools (validity, reliability, practicality); measurement of cognitive, affective, and psychomotor traits; sources and types of error in measurement, validity and reliability analyses of measurement tools, statistical techniques used in Item and Test Analyses (alternative correlation techniques), basic statistical operations performed on measurement results, descriptive statistics techniques (measures of central tendency and variability), graphical (bar graphs, frequency polygons, histograms, line graphs) and tabular (cross-tabulations) representations of measurement results, Normal distribution characteristics and standard scores (z and T scores); Standard error and confidence intervals; Bloom's taxonomy, writing questions appropriate for different test types (written, oral, short answer, true-false, multiple-choice) according to Bloom's taxonomy; achievement test and scale development and implementation processes.

AE Statistics (3-0-3-3)

Data definition, sample selection. Organization and analysis of data (Constructing frequency tables). Graphical representations (Bar chart, Stem-and-leaf plot, Histogram, etc.). Measures of central tendency. Measures of dispersion (or variability). Sampling distribution and estimation; concept of confidence interval. Interval estimation for the difference between two population means. Interval estimation for the ratio of two population variances. Interval estimation for the binomial parameter p. Hypothesis testing. Correlation. Regression analysis.

AE Geometry (3-0-3-3)

Explanation of axiom, undefined concept, and theorem. Fundamental axioms of Euclidean geometry. Relationships between the concepts of point, line, and plane. Concept of angle, its types, congruence of angles and congruence axioms, applications related to angles. Definition of the concept of triangle, types of triangles, fundamental and auxiliary elements of a triangle, congruence axioms and theorems related to triangles, applications related to congruence in triangles, similarity theorems related to triangles, applications related to similarity in triangles. Definition of the concept of polygon. Proof of theorems concerning geometric concepts such as trapezoid, parallelogram, rhombus, rectangle, square, and kite (deltoid). Applications related to quadrilaterals. Concepts of circle and disk (or circumference and area), theorems and proofs related to angles and lengths in the circle and disk, applications related to angles and lengths in the circle and disk. Properties of solids in space, applications related to the area and volume of solids.

AE	Material Design in Mathematics Instruction (2-0-2-2)
Fundamental concepts, terms, and definitions related to material technology; demonstrating the necessity of material use in light of various instructional philosophies and theories (constructivist theory-material use-discovery learning-material use-multiple intelligences-material use-information processing approach-material use, etc.); characteristics that materials should possess; development of two-dimensional materials (worksheets, slides, computer-supported worksheets); development of three-dimensional materials and guidelines for material use, development and implementation of the worksheet; examination of the usability of developed materials for different outcomes; research on the effectiveness of instructional materials; importance of project-based material design and its contributions in terms of measurement and evaluation.	
AE	**Algebra Instruction (3-0-3-3)**
Algebraic thinking, the importance of algebraic thinking in mathematics instruction; the pre-algebra period; the relationship between arithmetic and algebra; generalized arithmetic and functional thinking; fundamental concepts of algebra; different representations in algebra instruction; instruction of the topics: variable, algebraic expression, equality and equation, linear equations, identities, and inequalities (organizing course content, using appropriate instructional materials and strategies, etc.); student knowledge regarding these topics (understanding and interpreting student thinking about concepts, knowing the difficulties, errors, and misconceptions experienced by students and their causes); the relationship of these topics with daily life and other subjects; and the design and implementation of algebra instruction activities within the framework of the curriculum outcomes.	

7TH SEMESTER					
CODE	**COURSE TITLE**	**T**	**U**	**K**	**A**
MB	Teaching Practice 1	2	6	5	10
MB	Research Methods in Education	2	0	2	3
GK	Elective 3	2	0	2	3
AE	Geometry and Measurement Instructions	3	0	3	7
AE	History of Mathematics	2	0	2	5
AE	Elective 5	2	0	2	2
	Total	13	6	16	30

MB **Teaching Practice 1 (2-6-5-10)**

Making observations related to domain-specific instructional methods and techniques; conducting individual and group micro-teaching applications using domain-specific special instructional methods and techniques; developing domain-specific activities and materials, preparing instructional environments, managing the classroom, carrying out measurement, evaluation, and reflection.

MB **Research Methods in Education (2-0-2-3)**

Fundamental concepts and principles related to research methods; the research process (noticing a problem, identifying the problem and the sample, data collection and analysis, interpretation of results); general characteristics of data collection tools; analysis and evaluation of data; access to articles, theses, and databases; research models and types; basic paradigms in scientific research; quantitative and qualitative research designs; sampling, data collection, and data analysis in qualitative research; validity and reliability in qualitative research; examining, evaluating, and presenting articles or theses; preparing a research report in accordance with research principles and ethics; action research in education.

AE **Geometry and Measurement Instruction (3-0-3-7)**

The development and importance of geometric thinking, instruction of fundamental geometric concepts: Point, line, line segment, ray, plane, and space. Concept and instruction of angle. Concept and instruction of triangle. Concept and instruction of quadrilateral. Concept and instruction of polygon. Concept and instruction of circle and disk. Concept and instruction of congruence and similarity. Transformational geometry and its instruction. Pattern tiling and fractals. Geometric solids: Cylinder-prism, cone-pyramid, and sphere. The concept of measurement in mathematics instruction: Measuring time, the concept of measurement in mathematics instruction: Length, Area, and Volume.

AE **History of Mathematics (2-0-2-5)**

A brief history of numbers, mathematics in Mesopotamia, mathematics in Ancient Egypt, Greek mathematics and mathematicians, Indian mathematics, mathematicians of the Islamic and Turkic worlds, historical development of the concepts of derivative and integral, historical development of differential equations and linear algebra, the birth of contemporary mathematics, bibliographies of mathematicians and their contributions to mathematics.

8TH SEMESTER					
CODE	**CODE TITLE**	**T**	**U**	**K**	**A**
MB	Teaching Practice 2	2	6	5	10
MB	Guidance in Schools	2	0	2	3
GK	Elective 4	2	0	2	3
AE	Probability and Statistics Instruction	3	0	3	7
AE	Philosophy of Mathematics	2	0	2	5
AE	Elective 6	2	0	2	2
	Total	13	6	16	30

MB **Teaching Practice 2 (2-6-5-10)**

Making observations related to domain-specific special instructional methods and techniques; conducting micro-teaching applications using domain-specific special instructional methods and techniques; being able to plan a lesson independently, developing lesson-related activities and materials; preparing instructional environments, managing the classroom, carrying out measurement, evaluation, and reflection.

MB **Guidance in Schools (2-0-2-3)**

The place of Guidance and Psychological Counseling (GPC) services in education; the philosophy, aim, principles, and program of the developmental guidance model (comprehensive developmental GPC program); basic services/interventions; the role and function of teachers in classroom guidance; competencies to be gained in educational, vocational, personal, and social areas within the scope of GPC services; cooperation between the school administrator and teachers with the guidance counselor and psychological counselor; preparation and implementation of classroom GPC plans and programs.

AE **Probability and Statistics Instruction (3-0-3-7)**

What are probability and statistics? What are their similarities and differences with the field of mathematics? Fundamental concepts related to probability, child development of the probability concept, types of probability, probability simulations, probability distributions, student misconceptions related to probability. The statistical problem-solving process, the concept of distribution and the instruction of distributions. Measures of central tendency, measures of dispersion. Learning environment designs related to probability and statistics.

AE **Philosophy of Mathematics (2-0-2-5)**

What is Mathematics?; Mathematics and science; The place of mathematics in science; Mathematical thinking methods; Inductive-deductive distinction; Meanings of various mathematical concepts and propositions; Objectivity and real-world applicability in mathematics; Crises in mathematics; Philosophical views on the foundations of mathematics; Logicism; Formalism; Intuitionism; Structuralism; The works of pioneers in the philosophy of mathematics such as Frege, Russell, Hilbert, Brouwer, and Gödel.

ELECTIVE COURSES (T-U-K-A)	
VOCATIONAL KNOWLEDGE ELECTIVE COURSES (2-0-2-3)	
• Open and Distance Learning • Collaboration and Communication with Families • Collaborative Teaching • Child Psychology • Textbook Analysis (or Textbook Review) • Attention Deficit and Hyperactivity Disorder (ADHD) • Speech and Language Disorders • Educational Anthropology • Education Law • History of Education • Morality and Ethics in Education • Digital Content Development in Education • Drama in Education • Extracurricular Activities in Education • Curriculum Development in Education	• Project Preparation in Education • Critical and Analytical Thinking • Education of Hospitalized Children • Inclusive Education • Character and Value Education • Comparative Education • Microteaching • Museum Education • Out-of-School Learning Environments • Learning Disability (or Learning Difficulties) • Individualizing and Adapting Instruction • Sustainable Development and Education • History of Turkish Education • Adult Education and Lifelong Learning

COURSE DESCRIPTIONS of VOCATIONAL KNOWLEDGE

Open and Distance Learning (2-0-2-3)

Fundamental concepts and philosophy of open and distance learning; development of distance education worldwide; development of distance education in Turkey; learner and guide roles in distance education; technologies used in distance education; management of open and distance education; classroom management and its components in open and distance learning; open educational resources and global trends; massive open online courses (MOOCs); personalized learning environments; problems related to open and distance education and their solutions; open and distance education applications in teacher training; development of individual instructional materials and student support services in open and distance education; determining instructional strategies for different learning situations; research and evaluation in distance education.

Collaboration and Communication with Families (2-0-2-3)

Fundamental concepts related to the family, the family as a system, the child with special needs within the family life cycle, emotional stages experienced by families with children with special needs, the importance of collaboration with families, legal, philosophical, and practical justifications for collaboration with families, foundations of the family-centered approach, components of family-centered practices, basic principles in collaboration with families, collaboration strategies with families, verbal and non-verbal communication skills in communication with families, empathic and specialized listening skills, skills in guiding families to special education services and effectively informing them about their child with special needs, management of crisis moments with families, promoting family participation, and skills in effectively using communication channels with families (face-to-face structured and unstructured interviews, phone interviews; daily and weekly messages, communication book, class newspaper, interviews conducted through non-verbal communication channels such as e-mail).

Collaborative Teaching (2-0-2-3)

Fundamental concepts related to co-teaching, the definition of co-teaching, the importance of co-teaching, the historical development of co-teaching, co-teaching in Turkey and the world, factors directly influencing co-teaching, collaboration among family, teacher, and student, co-teaching models; the one teach, one observe model, the one teach, one assist model, the station teaching model, the parallel teaching model, the alternative teaching model, and the team teaching model.

Child Psychology (2-0-2-3)

Fundamental concepts, history, and methods of child psychology; developmental stages; prenatal development; developmental domains and characteristics of infancy; developmental domains and characteristics of early childhood; developmental domains and characteristics of late childhood; the child within the family structure; the child within the school system; adjustment and behavior problems during childhood; children with special needs.

Textbook Analysis (2-0-2-3)

Physical, educational, visual design, and language/expression features and standards that should be present in a textbook; the suitability of textbook content for the curriculum; examination of some existing textbooks in terms of content, language, suitability for student level, format, attractiveness, contribution to meaningful learning, ease of use in instruction, etc.

Attention Deficit and Hyperactivity Disorder (ADHD) 2-0-2-3)

Definition and characteristics of Attention Deficit and Hyperactivity Disorder (ADHD); core symptoms of ADHD (inattention, hyperactivity, and impulsivity); effects of ADHD on the child in terms of social, emotional, and academic success; causes of ADHD; risk factors in the formation of ADHD; types of ADHD; approaches to children with ADHD; referral of students with ADHD; education of children with ADHD; ensuring school-family collaboration.

Speech and Language Disorders (2-0-2-3)

Basic characteristics of language, perspectives on language acquisition, definition and classification of speech and language disorders, organs effective in speech, causes and prevalence of speech and language disorders, characteristics of children exhibiting speech and language disorders, classification of communication disorders, types of communication disorders, and the education of children exhibiting speech and language and communication disorders.

Educational Anthropology (2-0-2-3)

The subject matter, fundamental concepts, history, and method of anthropology; basic approaches in social-cultural anthropology; education from an anthropological perspective and fundamental concepts of educational anthropology: Culture, acculturation, enculturation, adaptation, subculture, counterculture, common culture, etc.; cultural foundations and functions of education; cross-cultural differentiation, education, and learning; the school as a living area, school cultures and ethnographies; media, mass communication tools, popular culture, and education; globalization, cultural interaction, cultural literacy, and education; education in oral and written literary works in Turkish culture and civilization history; roles of parents and children in the Turkish family structure.

Education Law (2-0-2-3)

Fundamental concepts of law and administrative law, sources of administrative law, rights and duties in administration, the Convention on the Rights of the Child and the Universal Declaration of Human Rights, administrative and judicial supervision of teachers, basic laws establishing and regulating the Turkish Education System, and the duties, rights, and responsibilities of education stakeholders.

History of Education (2-0-2-3)

Education in the Ancient period (Ancient Egypt, Mesopotamia, Anatolia, India, China, Ancient Greek, and Roman civilizations); education in Eastern, Western, and Islamic societies in the Middle and Early Modern Ages; the Renaissance, Reformation, Enlightenment Movements, and education; education in the Industrial Age and Modern Period; relations between Islamic culture and civilization and Western civilization; the emergence of nation-states and the development of national education systems; post-modern society discussions and education; fundamental changes and transformations in education worldwide from the Ancient period to the present.

Morality and Ethics in Education (2-0-2-3)

Fundamental concepts and theories related to morality and ethics; ethical principles, ethical rules, professional morality/ethics; the teaching profession in its social, cultural, moral, and ethical aspects; the right to education and learning; ethical principles in the process of education, instruction, learning, and assessment; ethical principles in relationships with education stakeholders (employers/administrators, colleagues, parents, professional organizations, and the community); moral/ethical responsibilities of education/school administrators, parents, and students; unethical behaviors in business and professional life; ethical regulations concerning public administration, education, and teachers in Turkey; unethical behaviors, ethical dilemmas, problems, and solutions in school and education; morality/ethics education and ethics committees in school; the school principal and teacher as moral/ethical leaders.

Digital Content Development in Education (2-0-2-3)

General overview of content development in digital environments, visuals in digital content development, animations/effective presentations in digital content development, measurement and evaluation activities in digital content development, collaborative tools in digital content development.

Drama in Education (2-0-2-3)

Fundamental concepts of drama and creative drama (drama, creativity, creative drama, play and theatre pedagogy, communication-interaction, role-playing, improvisation, action, dramatic play, children's theatre, puppet, pantomime, etc.); stages, dimensions, and elements of creative drama; role-playing and improvisation; history of creative drama; relationship between social events and creative drama; implementation steps of drama in education; resources that can be utilized in drama in education; preparation and implementation of the creative drama lesson plan; contribution of drama to individual and social development.

Extracurricular Activities in Education (2-0-2-3)

Concepts of formal curriculum and extracurricular activities/hidden curriculum in education; approaches related to the hidden curriculum; cognitive and affective domain learning and the hidden curriculum; the school as a place of ritual; school ceremonies as extracurricular activities in school; the importance and management of social, cultural, sports, and artistic activities in school; the place and importance of the hidden curriculum in values education; extracurricular activities (commemoration,celebration, meeting, graduation, etc.) in terms of values education.

Curriculum Development in Education (2-0-2-3)

Fundamental concepts related to curriculum development; theoretical foundations of curriculum development; types of curricula; philosophical, social, historical, psychological, and economic foundations of curricula; characteristics of curriculum development and curricula; stages of curriculum development; basic elements of the curriculum (aims, content, process, assessment) and the relationships between these elements; classification of aims and their relationship with curriculum elements; approaches to content organization; determination of educational needs; curriculum development process and models; curriculum design approaches; program evaluation models; curriculum literacy; duties and responsibilities of teachers in the development of curricula; characteristics of Ministry of National Education (MEB) curricula; implementation of curricula; new approaches and trends in curriculum development worldwide and in Turkey.

Project Preparation in Education (2-0-2-3)

The concept of project and project types, curricula and project-based learning, project programs in schools (TÜBİTAK, EU, and others), topic selection for the project, literature review, logical framework in the project, planning and management of the project, application of the scientific method in the project, preparing and developing the project report, finalizing the project report, project evaluation and examination of good practices, project presentations, techniques for designing posters and brochures.

Critical and Analytical Thinking (2-0-2-3)

Fundamental concepts and definitions; the brain as the organ of thought, forms of thinking and classification of thinking; involuntary thought and its characteristics; voluntary thought and its characteristics; methods of voluntary thought; critical and analytical thinking; fundamental characteristics and criteria of critical and analytical thinking, stages of critical and analytical thinking; factors affecting critical and analytical thinking; scope of critical and analytical thinking; critical and analytical reading; critical and analytical listening; critical and analytical writing.

Education of Hospitalized Children (2-0-2-3)

Developmental characteristics, interests, and needs, and psychological states of hospitalized children according to age groups; interaction among hospital staff, the child, and the family; preparatory education for hospitalization, preparation for diagnosis, treatment, and surgery; preparing and implementing activity plans (play, music, art, drama, mathematics, storytelling, etc.) for hospitalized children; interaction between hospital schools and children with terminal illnesses, their families, and staff.

Inclusive Education (2-0-2-3)

Inclusivity and the content of inclusivity; the definition, content, and importance of inclusive education; legal bases of inclusive education; national and international legislation; approaches and standards in inclusive education; teacher roles in inclusive education; inclusive curriculum and materials; attitudes and values in inclusive education; inclusive school and classroom; preparing an action plan for inclusive education; inclusive education practices; characteristics that differentiate students; effective communication; language used and psycho-social support; differentiating instruction and examples, methods and techniques; planning instruction, inclusivity in course materials and selection of inclusive activities; lesson design practices.

Character and Value Education (2-0-2-3)

Fundamental concepts and theories related to morality and ethics; ethical principles, ethical rules, professional morality/ethics; the teaching profession in its social, cultural, moral, and ethical aspects; the right to education and learning; ethical principles in the process of education, instruction, learning, and assessment; ethical principles in relationships with education stakeholders (employers/administrators, colleagues, parents, professional organizations, and the community); moral/ethical responsibilities of education/school administrators, parents, and students; unethical behaviors in business and professional life; ethical regulations concerning public administration, education, and teachers in Turkey; unethical behaviors, ethical dilemmas, problems, and solutions in school and education; morality/ethics education and ethics committees in school; the school principal and teacher as moral/ethical leaders.

Comparative Education (2-0-2-3)

The definition, scope, and history of comparative education; method and research in comparative education; comparison of the education systems of different countries in terms of structure, operation, school levels, human resources, financing of education, privatization in education, and policy making, planning, and implementation; gender, social justice, and equity in education in different countries; reform and innovation initiatives in education in different countries; teacher and education/school administrator training systems in different countries; globalization and internationalization in education; international examinations, institutions, and organizations related to education.

Microteaching (2-0-2-3)

Fundamental concepts and principles related to effective teaching and learning; teachers' professional competence, attitudes, roles, and behaviors; lesson plan preparation; scope, benefits, and limitations of the microteaching method; preparing active learning activities appropriate for the subject; conducting sample lesson presentations in the classroom; video recording of lesson presentations; evaluating the lesson using the recordings; improving the prepared activities and lesson presentations.

Museum Education (2-0-2-3)

The definition and characteristics of the museum, exhibition in museums; museum and museum education; types of museums; the development of Turkish museology; a general overview of the history of museology in the world; the relationship between museum, art, culture, and civilization; museum and art education; museum and society; the contribution of museums to historical consciousness; preserving historical artifacts; contemporary museology in the world and in Turkey.

Out-of-School Learning Environments (2-0-2-3)

Concepts of out-of-school education and learning; the scope and importance of out-of-school learning; instruction in out-of-school settings; instructional methods, techniques (project-based learning, station technique, etc.), and instructional materials appropriate for out-of-school learning environments; out-of-school learning environments (museums, science centers, zoos, botanical gardens, planetariums, industrial organizations, national parks, science festivals, science camps, natural environments, etc.); development of out-of-school learning areas and environments; planning, implementation, and evaluation of out-of-school learning activities.

Learning Disability (2-0-2-3)

Definition, characteristics, and classification of learning disability: Educational, psychological, and medical factors; prevalence and incidence; causes of learning disability; early intervention; response to intervention model; screening/diagnosis: medical, developmental, and educational screening/diagnosis; academic and non-academic characteristics; team and collaboration; educational settings; evidence-based practices; supporting reading, writing, and mathematics skills; supporting non-academic skills.

Individualizing and Adapting Instruction (2-0-2-3)

The concept of individualization and its importance in education; requirements for individualization: curriculum-based assessment, rough assessment, preparing criterion-referenced measurement tools, rules to be followed in assessment; determining long-term and short-term instructional goals; arrangements that can be made in classrooms and schools for inclusion/integration; adapting instruction; and examples of individualization and adaptation in inclusion/integration classrooms.

Sustainable Deelopment and Education (2-0-2-3)

The concept of sustainability and its areas of use; sustainability from the perspectives of social sciences and natural sciences; sustainability in the context of social change; education and sustainability; the future of humanity and sustainability; migration, poverty, and inequality; sustainable environment; ecology, global environmental problems, and sustainability; sustainable society in harmony with nature; population, economic system, and natural environment; technological developments, consumption habits, and the environment; social responsibility studies, sustainability in terms of tangible and intangible cultural heritage; rethinking human-nature relations on the axis of sustainability.

History of Turkish Education (2-0-2-3)

The subject matter, method, and sources of Turkish educational history; education in the first Turkic states; education in the first Muslim Turkic states; education in the Anatolian Seljuks and Anatolian Principalities; education in the Ottoman Empire: The education system until the first modernization movements; education in Turkic states outside the Ottoman geography in the 13th-18th centuries; modernization movements in education in the Ottoman Empire until the Tanzimat period; the establishment of the modern education system from Tanzimat to the Republic; reorganization of traditional education; education in other Turkic states and communities in Eurasia in the 19th-20th centuries; education during the National Struggle period; education in the Republic of Turkey: Foundations, structure, establishment, and development of the Turkish education system; the process of teacher training from its beginning to the present; education in the Turkic world in the 21st century; common goals, unity of language and alphabet, common history writing studies.

Adult Education and Lifelong Learning (2-0-2-3)

Definition and scope of adult education; concepts related to adult education (continuing education, public education, non-formal education, vocational training, etc.); historical development of adult education in Turkey; approaches and models related to adult education; adults and learning; aim, scope, and historical development of lifelong learning; lifelong learning practices in the Turkish education system.

ELECTIVE COURSES (T-U-K-A)	
GENERAL CULTURE ELECTIVE COURSES (2-0-2-3)	
• Addiction and Combating Addiction • Nutrition and Health • History and Philosophy of Science • Science and Research Ethics • Children's Rights and Protection • World Musics • Economy and Entrepreneurship • Traditional Turkish Handicrafts • General Geography • Semiotics • Human Rights and Democracy Education • Human Relations and Communication • Use of Internet Technologies • Culture and Language • Media Literacy	• Art and Aesthetics • Sound Recording Methods • Basic Information Technologies • Basic English • Turkish Folk Dances • Turkish Sign Language • Turkish Cultural Geography • Turkish Cultural History • Turkish Music • Turkish Art History • Geography of Turkey • History of Civilization • Three-Dimensional Design (3D Design) • Geography of Countries

COURSE DESCRIPTIONS of GENERAL CULTURE

Addiction and Combating Addiction (2-0-2-3)

Fundamental concepts and definitions; types of addiction (substance addiction, technology addiction, etc.); causes of addiction; risk factors in the context of family, peer group, and society that prepare a person for the process of substance addiction; communication skills in addicted children, adolescents, and adults; the role of social work in addiction; models related to addiction; addiction prevention efforts; consequences of addiction; national policy and strategic methods in combating addiction; the reintegration process.

Nutrition and Health (2-0-2-3)

Natural and healthy nutrition; combating obesity; food additives; healthy living and exercise; growth and development; healthy sexual life; combating addiction (tobacco, alcohol, substance addiction, etc.); traffic, disaster, and first aid.

History and Philosophy of Science (2-0-2-3)

Science, philosophy, the scientific method; Ancient Greek, Medieval Europe, Scholastic philosophy and science; science and philosophy in the Islamic cultural geography; science in Mesopotamia; science and philosophy in Renaissance Europe; science and philosophy in the Age of Enlightenment; classification of sciences; relations between science, scientism, ideology, ethics, and religion; science and paradigms; Vienna and Frankfurt schools of thought; critiques of science in the 20th and 21st centuries.

Science Research Ethics (2-0-2-3)

Science, the nature and development of science, and scientific research; the concept of ethics and ethical theories; research and publication ethics; unethical behaviors and ethical violations in the research process; ethical issues related to authorship and copyright; biased publication, editorship, peer review, and ethics; publication ethics and unethical behaviors in the publication process; legal legislation and boards related to research and publication ethics; procedures to follow in the detection of ethical violations; common research and publication ethics violations and methods aimed at preventing them.

Children's Rights and Protection (2-0-2-3)

Child rights and child protection laws, family and child welfare, child neglect, child abuse, preventive measures against child neglect and abuse, rights and protection of children in need of protection, rights and protection of children with special needs, planning cooperation regarding child rights and protection, and creating projects aimed at protecting child rights.

World Musics (2-0-2-3)

Historical and contemporary music cultures in the world's countries; globally recognized music genres; characteristics of music in various regions of the world and the geographical, cultural, religious, social, economic, and political factors contributing to these characteristics; comparisons of music cultures and traditions worldwide; and various societies and their musical traditions.

Economy and Entrepreneurship (2-0-2-3)

Fundamental concepts of economics and economic systems; fundamental concepts of business and business management; establishment, aims, and legal structure of a business; management processes and functions in businesses; management of human resources and other resources; concepts of entrepreneur and entrepreneurship, success factors in entrepreneurship; entrepreneurial culture, the entrepreneurship process and types of entrepreneurship; career planning, unique ideas, unconventional examples; Turkish Patent and Trademark Office; Industrial Property Law; small and medium-sized enterprises (SMEs); management processes and functions in small businesses; developing a business idea, novelty and innovation, making a business plan, the elements, writing, and presentation of the business plan; preparing a project related to entrepreneurship in a specific field and subject.

Traditional Turkish Handicrafts (2-0-2-3)

Terms and concepts related to traditional Turkish arts; the importance of traditional Turkish arts; their contributions to the individual, society, and the national economy; historical development of traditional Turkish arts (Huns, Göktürks, Uyghurs, Seljuks, Principalities, and Ottoman periods); the Ahi and Guild Organizations; institutions and organizations related to Turkish arts in the Republican era; classification of traditional arts according to raw materials and production techniques; traditional weaving (carpets-kilims, fabrics, etc.), printing, knitting, felt, glass (stained glass, glassware, beads, etc.) arts; metal (iron, copper, silver, and gold, etc.) arts; wood (kandekari, carving, and mother-of-pearl inlay) arts; tile-ceramic and stone carving arts; and the education, production, and marketing of traditional Turkish arts.

General Geography (2-0-2-3)

The development of the science of geography and the processes of acquiring scientific identity; the formation of the Earth and its geological past, internal structure, shape, movements, and the resulting consequences; the shaping of the Earth's surface and the factors effective in this process (geomorphology); the Earth's atmosphere and climate system (climatology); the distribution, characteristics, and effects of groundwater and surface water (hydrography); soil geography (formation, types, distribution, soil problems); plant geography (classification, habitat conditions, distribution), map knowledge.

Semiotics (2-0-2-3)

Fundamental concepts of linguistics and semiotics (the science of signs), the relationship between semiotics and communication, types of signs, contemporary semioticians and semiotic theories, characteristics of establishing correct communication skills.

Human Rights and Democracy Education (2-0-2-3)

The concept and historical development of human rights; types of human rights; understandings, principles, and approaches of democracy and human rights; democracy education and democratic education; family and democracy education; education as a human right; preschool education and democracy education; primary school curriculum and democracy education; democracy education in secondary education; higher education and democracy education; democratic school and classroom environment.

Human Relations and Communication (2-0-2-3)

Definition and classification of interpersonal relations; theoretical approaches related to human relations (psychoanalytic, attachment, contemporary theories); theoretical approaches related to interpersonal relations (social, psychological, cognitive theories); interpersonal relations as a developmental process (infancy and childhood periods, adolescence and adulthood periods); factors influencing interpersonal relations; gender, gender roles, and interpersonal relations; self-adjustment and self-disclosure in interpersonal relations; communication and communication errors; effective communication skills; interpersonal problems, conflict, and conflict resolution approaches; human relations from the perspective of cross-cultural differentiation.

Use of Internet Technologies (2-0-2-3)

Internet and Web technologies; historical development of distance learning; online and blended learning models; classification of Web technologies; characteristics and use of Web 2.0 tools; advantages and disadvantages of Web 2.0 tools; characteristics of Web 3.0 tools; advantages and disadvantages of Web 3.0 tools; designing and producing instructional content with Web tools; evaluation of instructional content developed with Web tools; and measurement and evaluation with Web tools.

Culture and Language (2-0-2-3)

Fundamental concepts related to language and culture; sources and elements of culture; oral and written culture; tangible and intangible culture; culture from individual and social perspectives; culture as unifying and differentiating; enculturation, acculturation, cultural diffusion, and adaptation; culture from cognitive, symbolic, and structural-functional perspectives; language as a system of symbols; language and language acquisition from an individual perspective; the effect of language on human consciousness; the relationship among culture, language, cognition, and reality; the function of language in carrying knowledge and culture, and establishing social relations and communication; development and transmission of language and culture; national identity and language; dynamics of changes in culture and language; discussions on the mutual interaction of changes in culture and language; national cultures; globalization, multilingualism, and multiculturalism.

Media Literacy (2-0-2-3)

Information literacy, conscious use of the internet and social media, effects of social media on individuals, power of information dissemination and deception, power of news dissemination, media and perception management, legal rights and responsibilities regarding media and the internet: Copyright, personal rights, information privacy, privacy violation. Language use in media, news value and quality analysis, popular culture, gender roles in media, consumer culture and advertisements, stereotyping in media.

Arts and Aesthetic (2-0-2-3)

Art, fine arts, craft, and culture; art and education; art, creativity, and the work of art; philosophy of art and aesthetics; art and aesthetic theories; art criticism; art history, art in pre-modern, modern, and post-modern periods; art and social context; art and daily life; Turkish-Islamic art-aesthetics and works of art; the position of art and the craftsperson in the process of social change; development of art in Turkey; contemporary understandings of art; civilization building and art; art, aesthetics, and morality.

Sound Recording Methods (2-0-2-3)

Understanding the nature of sound, sound propagation and acoustics, correct microphone placement, recording tools, understanding the format of audio files, pre-recording necessities, sound recording in different environments ranging from simple structures to studios, microphones and their characteristics, recording software, sound recording and mic-ing techniques.

Basic Information Technologies (2-0-2-3)

Information technologies and computational thinking; problem-solving concepts and approaches; algorithms and flowcharts; computer systems; fundamental concepts related to software and hardware; basics of operating systems, current operating systems; file management; utility programs (third-party software); word processing programs; spreadsheet/calculation/graphing programs; presentation programs; desktop publishing; database management systems; web design; use of the internet in education; communication and collaboration technologies; safe internet use; information ethics and copyrights; effects of computers and the internet on children/adolescents.

Basic English (2-0-2-3)

Basic English reading-writing-listening skills; fundamental concepts related to child development and stages; fundamental concepts related to basic and secondary education; fundamental concepts related to educational sciences; dialogue examples between student-parent-teacher; techniques for listening to and comprehending academic texts (youtube, teachertube, tedx talks, etc.); verbal skills for professional development purposes (vocabulary, idioms, etc.); writing skills (writing petitions, preparing reports, creating CVs, writing short messages, setting lesson objectives, etc.); reading skills (reading written texts using web 2.0 tools, etc.); and translation studies in the relevant teaching field.

Turkish Folk Dances (2-0-2-3)

The definition of folklore; rhythm and perception studies; play and folk dance, figure studies; figure studies including regional differences in folk dances, learning Bar-type regional figures, learning Halay and Kaşık (Spoon) type regional figures, learning Horon and Karşılama (Greeting) type regional figures, learning Zeybek-type regional figures; studies on the attitude and playing styles of the learned dances; staging of folk dances; and types and differences of staging.

Turkish Sign Language (2-0-2-3)

Fundamental concepts related to sign language; Turkish Sign Language, its history and characteristics; letters and phonology in Turkish Sign Language, the internal structure of the sign, simultaneity and sequencing; the manual alphabet in terms of phonology; morphology in sign language, the construction and formation of the sign; word classes and pronouns; syntax in sign language, word order; sentence types and question sentences; semantics in sign language; meaning and reference, types of meaning, idioms; and conversational practice using Turkish Sign Language.

Turkish Cultural Geography (2-0-2-3)

Culture, human, and society; Turkish culture and Turkish civilization; the first ethnographic sources about the Turks; Turkic states in history; state, administrative, military, and social structure among the Turks; folk beliefs and mythology among the Turks; the relationship between human and space among the Turks; oral, written, and tangible culture among the Turks; family structure among the Turks; demographic and cultural consequences of migrations experienced in Turkish history; areas of spread of Turkish culture and its influence on neighboring geographies; tangible and intangible cultural heritage possessed by Turkey; and the transmission of natural and cultural heritage to future generations.

Turkish Cultural History (2-0-2-3)

The migration of Turks from their Central Asian homeland, pre-Islamic Turkish history and culture; examination of examples from the cultural heritage. The acceptance of Islam by the Turks and the examination of cultural assets after Islam.

Turkish Music (2-0-2-3)

Musical elements belonging to Turkic communities living in Central Asia and Anatolia, Turkish mythology (human, creation, religious rituals, and holidays, etc.), mythological elements in the Turkish Folk Music repertoire, music genres existing in Turkic States and Communities, the development of Turkish Folk Music and Turkish Art Music throughout the historical process, the mutual interaction of different musical traditions and styles; and the examination of instruments, composers, performers, and sample works together.

Turkish Art History (2-0-2-3)

Comparative examination of the art styles and the architectural, sculptural, and painting examples belonging to the periods from Hunnish Art up to the Ottoman era, including the Göktürk, Uyghur, Karakhanid, Ghaznavid, Great Seljuk, Anatolian Seljuk, and Beyliks periods. Evaluation of Turkish art works and artists in the period starting from the Republican Era up to the present day.

Geography of Türkiye (2-0-2-3)

Turkey's location and position, Turkey's physical characteristics (geology and geomorphology, climate, hydrographic features, soil structure, vegetation), and socio-economic characteristics (population, settlement, agriculture, forestry, livestock, energy, mining, industry, transportation, tourism, trade).

History of Civilization (2-0-2-3)

Introduction of the concept of civilization and fundamental concepts related to this concept, the physical and cultural changes humanity has undergone in prehistoric and historical eras, and the effects of this change process on the present day. Examination of the civilizations that humanity has created from the past to the present: Mediterranean, Mesopotamian, Egyptian, Far Eastern, Indian, Central American (Aztec-Inca Civilizations), Central Asian Steppe Civilizations, and Western Civilization (Europe, America).

3D Design (2-0-2-3)

The ability to think and see in three dimensions, three-dimensional arrangements using the possibilities of clay or other materials, artistic forms, abstract thinking and problem-solving ability, three-dimensional Design, morphology (form knowledge), artistic expression, elements of three-dimensional design.

Geography of Countries (2-0-2-3)

General outline examination of the physical (landforms, climate, vegetation, hydrography, and soil characteristics), human (population and settlement characteristics), and economic geography features (agriculture, industry, mining, trade, tourism, etc.) of the continents of Asia, Europe, North America, South America, Oceania, and Africa; examination of the general geographical characteristics of some countries (such as Germany, the Russian Federation, the United States of America, Brazil, Australia, Azerbaijan, and the Republic of South Africa) located on these continents that have high economic power and maintain economic, political, and cultural relations with Turkey; the continent of Antarctica.

ELECTIVE COURSES (T-U-K-A)	
FIELD EDUCATION ELECTIVE COURSES (2-0-2-2)	
• Discrete Mathematics • Mathematics Instruction in Elementary School • Complex Analysis • Mathematical Olympiad Problems • Field Research Project in Mathematics Instruction • Algorithm and Programming in Mathematics Instruction • Drama in Mathematics Instruction • Activity Development in Mathematics Instruction • Communication in Mathematics Instruction • Connections in Mathematics Instruction • Conceptual Misconceptions in Mathematics Instruction • Logical Reasoning in Mathematics Instruction	• Microteaching in Mathematics Instruction • Modeling in Mathematics Instruction • Out-of-School Learning Environments in Mathematics Instruction • Learning Disability in Mathematics Instruction • STEM Approach Applications in Mathematics Instruction • Mathematics and Art • Numerical Analysis • Game Theory • Teaching Mathematics through Play • Non-Euclidean Geometries • Number Theory • Teaching Mathematics to Gifted Students

COURSE DESCRIPTIONS of FIELD EDUCATION

Discrete Mathematics (2-0-2-2)

Introduction, Propositional Logic, Propositional Equivalences, Predicates, Quantifiers, Nested Quantifiers, Rules of Inference and Examples, Introduction to Proofs. Sequences and Summations, Induction. Relations and Properties, Representing Relations, Termination of Relations, Equivalence Relations, Connectivity. Euler and Hamilton Paths, Shortest Path Problems. Planar Graphs, Graph Coloring. Introduction to Trees, Tree Applications, Tree Traversal.

Mathematics Instruction in Elementary School (2-0-2-2)

The aims and fundamental principles of primary school mathematics instruction; the aims, content, and philosophical approach of the primary school mathematics curriculum; special instructional methods used in primary school mathematics instruction: Piaget's, Vygotsky's, Bruner's, Bloom's, and Gardner's perspectives on learning; topics taught in the primary school mathematics course; development of number concept and number sense, arithmetic operations: multiplication and division, fraction concept and operations with fractions, development of geometric concepts and measurement, development of data analysis concepts, problem solving; similarities and differences between primary and secondary school mathematics curricula; mathematical understanding in primary school students; mathematical misconceptions and learning difficulties at the primary school level; measurement and evaluation in primary school mathematics courses.

Complex Analysis (2-0-2-2)

Complex numbers. Representations of complex numbers in trigonometric and exponential forms. Topology of the complex plane. Functions of a complex variable. Limit and continuity of functions of a complex variable. Complex power, exponential, and logarithmic functions. Trigonometric and hyperbolic functions. Inverse trigonometric and inverse hyperbolic functions. Differentiability of functions of a complex variable. Analytic functions. Analytic and Harmonic Functions. Complex integration; contour integrals. Cauchy-Goursat Theorem.

Mathematical Olympiad Problems (2-0-2-2)

Addition and multiplication principles, permutation and combination, distribution. Probability. The Pigeonhole Principle. Divisibility and the division algorithm. GCD (Greatest Common Divisor) and LCM (Least Common Multiple). Modular arithmetic. Fermat-Euler-Wilson-Chinese Remainder theorems. Power mean of order, important inequalities and their applications, solution of some inequalities. Sequences. Functions. Polynomials. Triangles, polygons, and quadrilaterals, circles. Trigonometry. Geometric inequalities.

Field Research Project in Mathematics Instruction (2-0-2-2)

The concept of project and project types; curricula and project-based learning; project programs in schools (TÜBİTAK, EU, and others); topic selection for the project; literature review; logical framework in the project; planning and management of the project; application of the scientific method in the project; preparing and developing the project report; finalizing the project report; project evaluation and examination of good practices; project presentations, techniques for designing posters and brochures.

Algorithm and Programming in Mathematics Instruction (2-0-2-2)

Introduction to Algorithms – What is an algorithm? Preliminary information about the C# Console Project – Explanations about the parts where the program starts and ends (Syntax). Introduction to C# variables. Performing basic operations with variables. Performing basic operations, exponentiation, and finding the remainder with variables. Basic automatic operations such as rounding variables. The Bool operator and If statements (including else if and else) using this operator. Operations related to Array types of variables. Preliminary information and discussion about loops. Functions that can return variables (return, get, set). Giving examples of the While loop (e.g., an algorithm that prints prime numbers from 1 to 100 on the screen, etc.). Examples on the While loop. Creating complex algorithms with all the learned information. Basic studies with Scratch or code.org.

Drama in Mathematics Instruction (2-0-2-2)

Fundamental concepts of drama and creative drama (drama, creativity, creative drama, play and theatre pedagogy, communication-interaction, role-playing, improvisation, action, dramatic play, children's theatre, puppet, pantomime, etc.); stages, dimensions, and elements of creative drama; role-playing and improvisation; history of creative drama; relationship between social events and creative drama; implementation steps of drama in education; resources that can be utilized in drama in education; preparation and implementation of the creative drama lesson plan; and the contribution of drama to individual and social development.

Activity Development in Mathematics Instruction (2-0-2-2)

The definition of activity, theoretical and philosophical foundations of mathematical activity; the purpose of using activities in mathematics instruction; the importance of using activities in mathematics instruction; characteristics of activities used in mathematics instruction; points to consider in preparing and implementing activities; evaluating sample activities; developing mathematical activities; and adapting mathematical activities.

Communication in Mathematics Instruction (2-0-2-2)

Mathematics as a language with its own unique symbols and terminology; the importance of using mathematical language appropriately and effectively within mathematics itself, in different disciplines, and in everyday life; relating mathematical language to everyday language and symbols; expressing mathematical ideas using various forms of representation such as concrete models, figures, pictures, graphs, tables, symbols, etc.; the nature of teacher-student communication in mathematics classrooms; the importance of determining and developing the competency of prospective mathematics teachers in using mathematical domain language; levels of mathematical language use and students' views on language; eye contact and body language behaviors of teachers with students as non-verbal communication skills and mathematics education; the effect of learning journals on mathematical communication; the effect of mathematical communication on students' achievement, attitudes, and metacognition; a sample mathematical language scale for measuring mathematical communication; and examples of the use of some everyday concepts in mathematics classrooms.

Connections in Mathematics Instruction (2-0-2-2)

The concept of 'connection' in Mathematics Education; relational understanding and relational learning in Mathematics Education; the relationship between concepts and other concepts in Mathematics Education; connecting a concept with its sub-concepts and the relationship among sub-concepts; connecting different representations of a concept; discussing a concept within a context; providing verbal examples from real life; addressing a concept within the context of a different discipline; establishing relationships between concepts and procedures; expressing mathematical concepts and rules using different forms of representation; relating different mathematical concepts to each other; relating mathematics to other subjects (repeated once for emphasis, included once for clarity); and preparing lesson plans related to all connection processes.

Conceptual Misconceptions in Mathematics Instruction (2-0-2-2)

Concepts of concept, term, misconception, conceptual confusion, cognitive disequilibrium, adaptation, assimilation, and schema; causes of misconception: ontological, epistemological, teacher-related, inherent to the nature of mathematics, etc.; the importance of detecting and remediating misconceptions in mathematics instruction; examples of misconceptions related to various learning domains and topics; and tools and graphic materials that can be used for detecting and remediating misconceptions: concept cartoons, semantic analysis tables, multiple-choice tests, open-ended questions, Predict-Observe-Explain (POE), concept maps, concept webs, and conceptual change texts.

Logical Reasoning in Mathematics Instruction (2-0-2-2)

Defending the accuracy and validity of inferences; making logical generalizations and inferences; explaining and utilizing mathematical patterns and relationships when analyzing a mathematical situation; making estimations regarding the result of operations and measurements using strategies such as rounding, grouping appropriate numbers, using the first or last digits, or strategies they develop themselves; and making estimations related to measurement by considering a specific reference point.

Microteaching in Mathematics Instruction (2-0-2-2)

Fundamental concepts and principles related to effective mathematics teaching and learning; mathematics teachers' professional competence, the necessity of developing mathematics teachers' professional competence, and the concept of lesson study (ders imecesi); attitudes, roles, and behaviors; lesson plan preparation; scope, benefits, and limitations of the microteaching method; preparing active learning activities appropriate for the subject; conducting sample lesson presentations in the classroom; video recording of lesson presentations; evaluating the lesson using the recordings; and improving the prepared activities and lesson presentations.

Modeling in Mathematics Instruction (2-0-2-2)

Introduction to the course, examination of the syllabus, model and the use of models in mathematics education. The relationship between model and modeling, mathematical modeling (Example models). The mathematical modeling process and the examination of different modeling processes in the literature. The place and importance of mathematical modeling in mathematics instruction. Different modeling perspectives (sample activities according to different perspectives). Mathematical modeling competencies. Examination of the relationship between the mathematical modeling process and modeling competencies. Use of modeling activities in instruction (sample activities). Characteristics of modeling activities according to different modeling perspectives. Implementation process of modeling activities in the classroom environment. Sample activity design process. Micro-teaching applications.

Out-of-School Learning Environments in Mathematics Instruction (2-0-2-2)

The scope of out-of-school learning, mathematics instruction in out-of-school settings. Instructional methods and techniques (project-based learning, station technique, etc.) and materials appropriate for out-of-school learning environments. Out-of-school learning environments (zoos, botanical gardens, etc.). Planning, implementation, and evaluation of out-of-school learning activities.

Learning Disability in Mathematics Instruction (2-0-2-2)

Definition of mathematics learning disability causes of mathematics learning disability; characteristics of individuals with mathematics learning disability; diagnosis methods for individuals with mathematics learning disability and intervention methods for individuals with mathematics learning disability; designing individualized education and instruction programs for individuals with mathematics learning disability.

STEM Approach Applications in Mathematics Instruction (2-0-2-2)

Definitions, terms, and concepts related to STEM education; Problem-based learning approach; Project-based education approach; 21st-century skills and the need for STEM education; Creation of interdisciplinary project-based mathematics activities; Creation, implementation, discussion, and re-design/evaluation of STEM-based activities; Examination of the place of STEM education in the mathematics curriculum, and examination of research on STEM education and preparation of research proposals.

Mathematics and Art (2-0-2-2)

Definitions, terms, and concepts related to mathematics and art; the relationship of the mathematics curriculum with art; What is MATHART? Studies within the scope of MATHART; Turkish MATHART artists and their works; Fractals: What is a fractal, the genesis and applications of fractals; some fractal generation software; Relationship between Mathematics and Painting: Perspective studies; the golden ratio in painting; Mathematics and Music - Archimedes' contributions to music, measurements - the golden ratio in musical works - the mathematics in instrument making - examination of the outlines of Mathematical Music Theory; Mathematics and Architecture - the mathematics in architectural works - the works and characteristics of Mimar Sinan - the golden ratio in architecture - the mathematics in the Pyramids - the mathematical structure and characteristics in Islamic works; Interaction between Mathematics and Some Handicrafts - the mathematics in carpets and kilims (motif, pattern, transformations, and symmetry) - sculpture making and mathematical solids; Interaction between Mathematics and Some Handicrafts - mathematics in tile and mosaic arts - mathematics in the making of baskets, ornaments, and jewelry - stone and wood carving and mathematics in Islamic art; Origami / Kirigami - Origami and its brief historical development, origami examples - Kirigami and its brief historical development, kirigami examples - utilization of origami and kirigami in education.

Numerical Analysis (2-0-2-2)

Errors and computer arithmetic in numerical analysis, algorithms and convergence. Taylor series. Difference equations. Computer arithmetic, error analysis. Finding roots of equations; Bisection method, Newton's method, Secant method. Fixed point. Polynomial interpolation, Divided differences, Hermite interpolation. Numerical differentiation and integration. Romberg algorithm. Gauss formula.

Game Theory (2-0-2-2)

Fundamental concepts of game theory and game examples. Two-person zero-sum finite games. Payoff matrix. The value of a two-person zero-sum finite game in the class of mixed strategies and the existence of the value. The Von Neumann theorem. The concept of optimal strategy and the solution of the game. Equilibrium strategies. Dominant strategies. The concept of required strategy in optimal strategies. Finding solutions for two-by-m games using the graphical method. Finding solutions for n-by-m games. The Brown-Robinson method. Two-person non-zero-sum finite games. The maxmin strategy of the game and the maxmin value. The concept of equilibrium strategies and the existence of equilibrium strategies in a two-person non-zero-sum finite game, the Nash theorem. Finding equilibrium strategies in two-by-two bimatrix games. The Swastika method. Pareto optimal strategies. Concepts of Nash solution and definite solution. Cooperative games. Random composite strategies. Nash bargaining procedure. Status quo. Maxmin bargaining solution.

Teaching Mathematics Through Play (2-0-2-2)
Games and types of games; the importance of games in mathematics instruction; theoretical approaches to games; logic, mathematics, intelligence games/puzzles; interaction between mathematics and games; examination of some games developed by mathematicians; cultural mathematics games; game theory; technology-supported mathematics games.
Non-Euclidean Geometries (2-0-2-2)
Postulates of Euclidean geometry, the emergence of non-Euclidean geometries and fundamental information about these geometries, Cayley-Klein's nine different plane geometries, distance (elliptic, parabolic, hyperbolic) and angle (elliptic, parabolic, hyperbolic) measurements specific to Cayley-Klein geometries, Affine Cayley-Klein plane geometries, fundamental concepts of Minkowski (Lorentz) geometry, fundamental concepts of Galilean geometry, basic linear algebra information in Affine Cayley-Klein planes, curves in Affine Cayley-Klein planes, generalized complex plane and its geometry, generalized complex numbers and geometry, and the relationship between plane geometries and number geometries.
Number Theory (2-0-2-2)
Divisibility, the Division Algorithm, Greatest Common Divisor (GCD), Least Common Multiple (LCM), the Euclidean Algorithm, Unique Factorization (or Uniqueness of Factorization), General Exercises. Congruences, Linear Congruences, the Chinese Remainder Theorem, Euler's Phi (Ø) function.
Teaching Mathematics to Gifted Students (2-0-2-2)
Identification of gifted students in mathematics, advantages and disadvantages of labeling; characteristics of gifted students, development of giftedness in mathematics, program options for gifted students, differentiation, enrichment, and acceleration for gifted students, supporting the gifted student in the classroom, social relations with gifted students; and individualized education programs for gifted students.