PRIMARY SCHOOL MATHEMATICS TEACHING UNDERGRADUATE PROGRAM

1st SEMESTER

	COURSE TITLE	T	P	C
A	General Mathematics	4	2	5
GK	Turkish I: Written Expression	2	0	2
GK	Atatürk's Principles and Revolutionary History I	2	0	2
GK	Bilgisayar I	2	2	3
GK	Yabancı Dil I	3	0	3
MB	Introduction to Education Science	3	0	3
TOTAL		16	4	18

2nd SEMESTER

	COURSE TITLE	T	P	C
A	Abstract Mathematics	3	0	3
A	Geometry	3	0	3
GK	Turkish II: Oral Expression	2	0	2
GK	Atatürk's Principles and Revolutionary History II	2	0	2
GK	Foreign Language II	3	0	3
GK	Computer II	2	2	3
MB	Educational Psychology	3	0	3
TOTAL		18	2	19

3rd SEMESTER

	COURSE TITLE	T	P	C
A	Analysis I	4	2	5
A	Linear Algebra I	3	0	3
A	Physical I	4	0	4
A	Elective I	2	0	2
GK	Scientific Research Methods	2	0	2
MB	Teaching Principles and Methods	3	0	3
TOTAL		18	2	19

4th SEMESTER

	COURSE TITLE	T	P	C
A	Analysis II	4	2	5
A	Linear Algebra II	3	0	3
A	Physical II	4	0	4
GK	Elective I	3	0	3
MB	Instructional Technologies and Material Design	2	2	3
TOTAL		16	4	18

5th SEMESTER

	COURSE TITLE	T	P	C
A	Analysis III	3	0	3
A	Analytical Geometry I	3	0	3
A	Statistics and Probability I	2	2	3
A	Introduction to Algebra	3	0	3
GK	History of Science*	2	0	2
MB	Elective I	2	0	2
MB	Special Teaching Methods I	2	2	3
TOTAL		17	4	19

6th SEMESTER

	COURSE TITLE	T	P	C
A	Differential Equations	4	0	4
A	Analytical Geometry II*	3	0	3
A	Statistics and Probability II*	2	2	3
A	Special Teaching Methods II	2	2	3
GK	Turkish Education History*	2	0	2
GK	Community Service Practices	1	2	2
MB	Measurement and Evaluation	3	0	3
TOTAL		17	6	20

7th SEMESTER

	COURSE TITLE	T	P	C
A	Elementary Number Theory*	3	0	3
A	Elective II	3	0	3
GK	History of Mathematics*	2	0	2
MB	Guidance	3	0	3
MB	School Experience	1	4	3
MB	Classroom Management	2	0	2
MB	Special Education*	2	0	2
TOTAL		16	4	18

8th SEMESTER

	COURSE TITLE	T	P	C
A	Philosophy of Mathematics*	2	0	2
GK	Elective II	3	0	3
MB	Turkish Education System and School Management	2	0	2
MB	Teaching Practice	2	6	5
MB	Elective II	3	0	3
TOTAL		12	6	15

		Theoretical	Application	Credit	Hours
GRAND TOTAL		130	32	146	162

A: Field and field education courses, MB: Teaching professional knowledge courses, GK: General culture courses

CUMHURIYET UNIVERSITY
FACULTY OF EDUCATION PRIMARY EDUCATION DEPARTMENT
MATHEMATICS TEACHING UNDERGRADUATE PROGRAM COURSE CONTENTS

1st SEMESTER

General Mathematics (4-2-5)

The set of natural numbers, the set of integers, the set of rational numbers, the set of real numbers and their properties. Second-degree equations and inequalities, analytic examination of the straight line, analytic examination of the circle and related applications. The concept of function, polynomials, rational functions, trigonometric functions, hyperbolic functions, exponential and logarithmic functions and their elementary inverses. Graphs of functions. Principle of mathematical induction, properties of sum and product symbols, basic concepts related to sequences and series. Complex numbers and their properties.

Turkish I: Written Expression (2-0-2)

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

Atatürk's Principles and History of the Turkish Revolution I (2-0-2)

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

Computer I (2-2-3)

Basic concepts related to information technologies, software and hardware, operating systems in general, word processing programs, spreadsheet programs, data presentation, Internet usage in education, effects of information technologies on social structure and their place in education, information systems security and related ethical concepts.

Foreign Language I (3-0-3)

This course is designed to enable university students to use reading, speaking, listening, and writing skills in a certain efficiency in all kinds of academic activities they conduct in their fields. In this course, students' linguistic and communicative competence and foreign language proficiency will be improved by creating engaging contexts, providing exercises that increase language fluency, and demonstrating the use of language in real communication skills.

2nd SEMESTER

Introduction to Educational Science (3-0-3)

Basic concepts of education, relationship of education with other sciences and its functions (philosophical, social, legal, psychological, economic, political foundations of education), historical development of educational science, trends in educational science in the 21st century, research methods in educational science, structure and characteristics of the Turkish National Education System, the role of the teacher in the education system, characteristics of the teaching profession, practices and developments in teacher training.

Abstract Mathematics (3-0-3)

Explanation of the concepts of axiom and theorem, explanation of direct and indirect mathematical proof methods. Axioms and theorems related to symbolic logic, applications related to symbolic logic. Universal and existential quantifiers, explanation of the concept of set, operations related to the concept of set. Cartesian product set and graph drawing, the concept of relation and its properties, types of relations, equivalence and order relations, properties of these relations. Construction of numbers using equivalence classes. The concept of function, injective (one-to-one), surjective (onto), bijective, constant, identity functions, composition of functions, inverse functions, and applications related to functions. The concept of cardinality (power) in sets, finite and infinite sets.

Geometry (3-0-3)

Definition of geometry, its structure and use in real life. Explanation of axiom, undefined term, theorem. Euclid and non-Euclidean geometries, basic axioms of Euclidean geometry. Relationships between the concepts of point, line, and plane. The concept of angle, its types, congruence of angles and congruence axioms, applications related to angles. Definition of the concept of polygon. 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. Proof of theorems related to geometric concepts such as trapezoid, parallelogram, rhombus, rectangle, square, deltoid. Applications related to quadrilaterals. The concepts of circle and disk (area of a circle), theorems and proofs related to angle and length in a circle and disk, applications related to angle and length in a circle and disk. Properties of solids in space, applications related to the area and volume of solid bodies.

Turkish II: Oral Expression (2-0-2)

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

Atatürk's Principles and History of the Turkish Revolution II (2-0-2)

Revolutions in the political field, political parties and attempts to transition to multi-party political life, revolutions in the legal field, regulation of social life, innovations in the economic field. Turkish foreign policy in the 1923-1938 period, Turkish foreign policy after Atatürk, Principles of the Turkish Revolution: (Republicanism, Populism, Secularism, Revolutionism, Statism, Nationalism). Complementary principles.

3rd SEMESTER

Foreign Language II (3-0-3)

This course is designed to enable university students to use reading, speaking, listening, and writing skills in a certain efficiency in all kinds of academic activities they conduct in their fields. In this course, the goal should be to raise the knowledge and skills gained by students in the "Foreign Language I" course to a higher level. While doing this, attention should be paid to creating engaging contexts, providing exercises that increase language fluency, using language in real communication skills, and thereby increasing students' linguistic and communicative competence and foreign language proficiency.

Computer II (2-2-3)

Basic concepts related to computer-assisted education, its elements, theoretical foundations, benefits and limitations, application methods, common formats used in computer-assisted instruction, evaluation and selection of course software, distance education applications, database applications, negative effects of computers and the Internet on children/youth and their prevention.

Educational Psychology (3-0-3)

Education-Psychology relationship, definition and functions of educational psychology, basic concepts related to learning and development, developmental characteristics (physical, cognitive, emotional, social, and moral development), factors affecting learning, learning theories, reflections of learning theories on instructional processes, effective learning, factors affecting learning (motivation, individual factors, group dynamics and the effect of these factors on the in-class instructional process).

Analysis I (4-2-5)

Concept of limit for single-variable functions and applications. Continuity and applications for single-variable functions, types of discontinuities. Concept of derivative for single-variable functions and differentiation rules. Derivatives of trigonometric, logarithmic, exponential, hyperbolic functions and their inverses, as well as implicit functions. Higher-order derivatives. Extrema and absolute extrema points of functions, extremum problems and applications in various fields. Rolle's and Mean Value Theorems. Finite Taylor's Theorem. L'Hospital's Rule and limit calculations using this rule. Differential and linear increase. Concept of integral, indefinite integrals, techniques of integration, definite integrals, area and volume calculations with definite integrals, applications in various fields.

Linear Algebra I (3-0-3)

Vectors in R^2 and R^3, $m \times n$ matrices; addition and scalar multiplication in matrix space, linear independence in matrix space, a brief introduction to the concept of vector space. Systems of linear equations, Gauss elimination, subspaces. Linear independence and dimension. Linear transformations, the relationship between linear transformations and matrices, matrix multiplication, the inverse of matrices and applications.

Physics I (4-0-4)

Standards, SI unit system, dimensional analysis, vectors. Kinematics: Definition and variables of motion, examples of motion in one and two dimensions, relative velocity. Dynamics: Newton's laws and applications, universal gravitation, friction force. Energy: Work, power, types of mechanical energy, energy in conservative and non-conservative force systems. Linear Momentum: Center of mass, interaction in one and two dimensions. Rotational Motion: Equilibrium in rigid bodies, kinematics and dynamics of rotational and rolling motion, energy and angular momentum. Mechanical Properties of Matter: Particle structure and states of matter, tension, shear, and bulk modulus, pressure, buoyant force, viscosity and moving fluids, Bernoulli's principle. Oscillatory Motion: Kinematics, dynamics, and energy of simple harmonic motion, damped and forced oscillations, resonance. Wave Motion: Kinematics, dynamics, energy, reflection, refraction, and interference, sound waves, standing waves, resonance, sound intensity, Doppler effect.

4th SEMESTER

Scientific Research Methods (2-0-2)

Science and basic concepts (fact, knowledge, absolute, true, false, universal knowledge, etc.), basic information about the history of science, the structure of scientific research, scientific methods and different views on these methods, problem, research model, population and sample, data collection and data collection methods (quantitative and qualitative data collection techniques), recording, analysis, interpretation, and reporting of data.

Principles and Methods of Instruction (3-0-3)

Basic concepts related to instruction, principles of learning and teaching, importance and benefits of planned work in instruction, planning of instruction (unitized annual plan, daily plan and activity examples), learning and teaching strategies,

Analysis II (4-2-5)

Concept of multi-variable function, domain and range of functions, function plotting. Concept of limit and applications for two-variable functions, concept of continuity. Partial derivatives for two-variable functions, chain rule, differential increase and linearization, local extremum values, absolute extremum values and applications, Lagrange multipliers, concept of double integral, volume calculations with double integral.

Linear Algebra II (3-0-3)

Orthogonality; concept of orthogonality in R^n and distance function, Gram-Schmidt process, orthogonal matrices, least squares and applications. Determinants; determinants and reduction, solving linear equations with Cramer's rule. Characteristic equation of a matrix, eigenvalues and eigenvectors, diagonalization and matrix operations.

Physics II (4-0-4)

Electric Force and Field: Charge and its conservation, charging, Coulomb's law, fields of discrete and continuous charges. Potential Energy of Static Charge: Potential in discrete and continuous charges, potential difference, dielectrics, connection and energy in capacitors. Direct Current: Current, power sources, electromotive force (emf), resistors, energy and power, DC circuits, structure of measuring devices, electricity use and safety. Magnetic Force and Field: Interaction of magnetic field with current-carrying conductors and moving charges, Biot-Savart law, fields created by currents in different shaped conductors, Hall effect, magnetic properties of matter. Electromagnetic Induction: Faraday's law of induction, Lenz's law, self-induction, magnetic field energy, AC generators, electric motors, transformers. AC Circuits: Resistance, current, phase difference, resonance state in RL, RC, and RLC circuits, radio transmitter and receiver. Electromagnetic Waves: Oscillation of electric and magnetic fields, e.m. waves generated in a dipole antenna, spectrum, energy, and momentum of e.m. waves.

Instructional Technologies and Material Design (2-2-3)

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

5th SEMESTER

Analysis III (3-0-3)

Concept of sequence and applications. Concept of series, positive-termed series, divergence and convergence in series, alternating series and convergence criteria related to series, power series. Function series, pointwise and uniform convergence in function series, generalized convergence tests, Taylor series and their applications in daily life. Fourier series.

Analytic Geometry I (3-0-3)

Point and line relationship in plane analytic geometry, vectors in the plane, line and basic problems, circle and basic problems, ellipse and basic problems, hyperbola and basic problems, parabola and basic problems.

Statistics and Probability I (2-2-3)

Basic concepts, frequency distributions, histogram and frequency polygon, graphical representation of categorical data and applications. Parametric and non-parametric measures of central tendency and applications. Parametric and non-parametric measures of dispersion and applications. Skewness and kurtosis. Basic concepts in probability theory, addition and multiplication rules, Bayes' theorem, probability distribution table, expected value and applications. Basic concepts in discrete probability distributions, Binomial, Poisson, and hypergeometric distribution and applied studies.

Introduction to Algebra (3-0-3)

Binary operations, definition of a group, subgroups, permutation groups, homomorphism, cyclic groups, residue classes, normal subgroups, quotient groups, definition of a ring, subrings, ideals.

History of Science* (2-0-2)

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

Special Teaching Methods I (2-2-3)

Basic concepts specific to the field and their relationship with field teaching, legal basis of the field teaching, especially the Constitution and the Basic Law of National Education, general aims of field teaching, methods, techniques, tools, and materials used. Examination of the relevant Curriculum (aims, achievements, themes, units, activities, etc.). Examination and evaluation of sample course, teacher, and student workbooks.

6th SEMESTER

Differential Equations (4-0-4)

Concept of differential equation, classification of differential equations, initial-value problems, general solutions, separable equations, homogeneous equations, equations reducible to homogeneous form, exact differential equations, integrating factor and equations reducible to exact differential equations, first-order linear differential equations, Bernoulli and Riccati type differential equations. First-order higher-degree equations, second-order equations not containing one of the variables, applications of second-order differential equations. Higher-order differential equations and linear differential equations and their solutions.

Analytic Geometry II* (3-0-3)

Vectors in three-dimensional space, line and plane equations, vector equations of line and plane and related problems. Conics in space, sections of planes and conics.

Statistics and Probability II* (2-2-3)

Concept of normal distribution, characteristics of normal distribution, standard normal curve areas, normal approximation to discrete distributions, normal approximation to Binomial, normal approximation to Poisson distribution, normal approximation to hypergeometric distribution and applications. Brief theoretical information on sampling theory, sampling distribution of means, sampling distribution of proportions, sampling distribution of differences between means, sampling distribution of differences between proportions and applications. Brief theoretical information on estimation theory, point estimation and confidence limits, confidence interval for means, confidence interval for proportions, confidence interval for standard deviations, confidence interval for differences between means, confidence interval for differences between proportions and applied studies.

Special Teaching Methods II (2-2-3)

What are problems and problem-solving? Importance of problem-solving, classification of problems, aims of problem-solving instruction and the problem-solving process. Instruction of solving four-operation problems, strategies for solving non-routine problems. Natural numbers and operations on natural numbers, fractions and their instruction, measurements and their instruction, data processing, geometry instruction. Project-Based Learning. Preparing, presenting, and evaluating a lesson plan.

Turkish Educational History* (2-0-2)

The importance of Turkish educational history in terms of the phenomenon of education. The state of education and teacher training institutions before the Republic. Turkish Education Revolution 1: Historical background, philosophical, intellectual, and political foundations of the revolution. Turkish Education Revolution 2: Tevhid-i Tedrisat Law (Law on the Unification of Education): its historical foundations, scope, implementation, and

importance; secularization in the Turkish education system. Turkish Education Revolution 3: Coeducation and girls' education, the Alphabet Revolution, national schools (millet mektepleri), people's houses (halk evleri). The fundamental principles on which the education system of the Republic of Turkey is based. Village Institutes, Education Institutes, and Higher Teacher Schools. Universities and teacher training. Recent developments in the field of Turkish education.

Community Service Practices (1-2-2)

Importance of community service practices, preparing projects to identify and solve current community problems, attending scientific events such as panels, conferences, congresses, symposiums as an audience member, speaker, or organizer, volunteering in various projects within the framework of social responsibility, gaining basic knowledge and skills for the implementation of community service activities in schools.

Measurement and Evaluation (3-0-3)

The place and importance of measurement and evaluation in education, basic concepts related to measurement and evaluation, desired qualities in measurement tools (reliability, validity, usability), measurement tools used in education and their characteristics, tools based on traditional approaches (written exams, short-answer exams, true-false type tests, multiple-choice tests, matching tests, oral examinations, assignments), tools aimed at comprehensively knowing the student (observation, interview, performance evaluation, student product portfolio, research papers, research projects, peer evaluation, self-evaluation, attitude scales), basic statistical operations performed on measurement results, evaluation of learning outcomes, grading, development of a measurement tool related to the field.

7th SEMESTER

Elementary Number Theory* (3-0-3)

Divisibility in integers, Prime Numbers, Important functions in number theory, Congruences, Linear congruence, Uniqueness of prime factorization in integers, Primitive roots and indices, Quadratic Residues (second degree), encryption topics and application areas in daily life, continued fractions.

History of Mathematics* (2-0-2)

The development of arithmetic and operations starting from 50,000 B.C. Studies on mathematics and bibliographies of the mathematicians who carried out these studies, on topics such as Geometry, areas, solids, analytic geometry, modern geometry, geometry tools, algebra, equations, Binomial theorem, logarithm, trigonometry, measurements, metric system, sets, integral, computers, numbers, structures, equation solving, vectors and graphs.

Guidance (3-0-3)

Basic concepts, student personal services, the place of psychological counseling and guidance within these services, principles of guidance, its development, types of psychological counseling and guidance, services, techniques, organization and personnel, new developments in the field, student assessment techniques, cooperation between guidance counselor and teacher, guidance duties to be performed by the teacher.

School Experience (1-4-3)

Observing a day of the teacher and a student in the school, observing how the teacher organizes the lesson, how the teacher divides the lesson into stages, how the instructional methods and techniques are applied, what kind of activities are used in the lesson, what the teacher does for lesson management and classroom control, how the teacher concludes the lesson, and how student work is evaluated, examining the organizational structure of the school, how the school principal performs their duty, and the school's relationship with the community it is in, preparing a portfolio reflecting the school experience studies.

Classroom Management (2-0-2)

Basic concepts related to classroom management, in-class communication and interaction, definition of classroom management, differences and features of the classroom management concept from ensuring discipline in the classroom, in-class and out-of-class factors affecting the classroom environment, classroom management models, developing and applying rules in the classroom, physically arranging the classroom, management of undesirable behaviors in the classroom, time management in the classroom, classroom organization, creating a positive classroom environment suitable for learning (examples and suggestions).

Special Education* (2-0-2)

Definition of special education, basic principles related to special education, causes of disability, importance of early diagnosis and treatment, historical approach to viewing disability, characteristics and education of children with intellectual disability, hearing impairment, visual impairment, physical disability, language and communication disorders, chronic illnesses, specific learning disabilities, attention deficit and hyperactivity disorder, autism, and giftedness, education of differently developing children through play, reactions observed in the families of children with special needs, the situation of special education in our country, and institutions and organizations established for this purpose.

8th SEMESTER

Philosophy of Mathematics* (2-0-2)

Ontology and epistemology of mathematics, meanings of mathematical concepts such as numbers, sets, functions, etc., and propositions and mathematical expressions. Foundations of mathematics, methods, and philosophical problems related to the nature of mathematics. Objectivity in mathematics and applicability to the real world. Works of pioneers of the philosophy of mathematics such as Frege, Russell, Hilbert, Brouwer, and Gödel. Fundamental theories in the philosophy of mathematics: Logicism, Formalism, Structuralism, and Intuitionism.

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

Aims and basic principles of the Turkish education system, legal regulations related to education, structure of the Turkish education system, management theories and processes, school organization and administration, matters related to personnel, students, instruction, and operation in school administration, social participation in the school.

Teaching Practice (2-6-5)

Preparing a daily plan every week, implementing the prepared plan, evaluation of the implementation by the teacher in the school, faculty member, and practice student, making corrections in line with the evaluations and re-implementing, preparing a portfolio.