Course Contents

(Current Curriculum)

Analysis I (MAT1011)

Real Numbers and properties of real numbers. Definition of Neighborhood and Mathematical induction. Definition of function, finite, countable infinity and uncountable sets. Real Valued Functions: Properties of functions. Sequences of Real Numbers, convergent sequences. Monotone sequences, subsequences and convergence theorems. Cauchy sequences, limit inferior and limit superior. Elementary functions; logarithm and exponential function. Hyperbolic functions. Infinite Series; convergence and absolute convergence. Power series. Definiton of limit of a function and properties of limit. Left sided and right sided limits.

Analytic Geometry I (MAT 1021)

Cartesian coordinate systems in the plane and space.Vectors in the plane and space. Lines in the plane. Lines and planes in space. Conics: Circle, Ellipse, Hyperbola, Parabola.

Linear Algebra I (MAT 1037)

Vectors, norm of a vector, systems of linear equations, matrix and matrix operations, systems of linear equations and matrix, vector spaces, subspaces, linear independence, basis and dimension.

Computer Applications I (BSP2041)

What is Mathematica? Introduction Graphs, limit, and Continuity of Fucntions in Mathematica. Differentiation in Mathematica Integration in Mathematica. Applications of the Integral

Analysis II (MAT 1012)

Continuous Functions. Propeties of function defined on an interval. Uniform continuity. Definiton of derivative. Mean value theorems and their applications, Taylor and Maclaurin series, Power series expansion of a function, definition of an integral, properties of integrals, Integrable functions, Methods of integration: Change of variable, integration by parts , integration of rational functions, Binomial integrals, integration of trigonometric functions, applications of integral.

Analytic Geometry II (MAT 1022)

Circle and Analytic Invetigation of Circle,General Quadratic Equation,Lines in Three Dimensional Space,The Basic Problems,Surface and Spheres,The Basic Problems,Cones and Cylinders,The Basic Problems.Surface of Revolution,The Basic Problems,Quadratic Surfaces of Canonical Equations,The Basic Problems,Change of Variables in Three Dimensional Space and General Quadratic Equation,The Basic Problems.

Linear Algebra II (MAT 1038)

Inner product, orthogonality in inner product, Gram-Schmidt process, determinants, cramer rule, eigenvalues and eigenvectors, diagonalization and matrix operations, linear transformation, change of basis.

Computer Applications II (BSP 2042)

Introduction to Differential equations in Mathematica Infinite series in Mathematica Calculus of vector valued functions in Mathematica Differentiation in several variables in Mathematica Multiple Integration in Mathematica Line and surface integrals in Mathematica Fundamental Theorems of vector analysis in Mathematica

History of Atatürk's Principles and Reforms I (ATA 121)

General condition of the Ottoman Empire; General appearances of main European states before World War I; Relationship with Turkey and Europe, East Question, wars in 1911-1913; World War I, the position of the Ottoman Empire in World War I, fronts; Fronts, Dardanells Wars and its effects, partition plans on Empire during the World War I; Brest-Litowsk Treaty, principles of Wilson, other treaties with Bulgaria, Ottoman Empire, Germany and Austurian-Hungary states; Peace Summit in Paris, end of the World War I, economical condition of Ottoman Empire and laborer movements Mondros Armistice, minorities, the state of Ottoman army, cabinets, occupation of Smyrna; The beginning of the new period and Mustafa Kemal Ataturk, congresses, national assembly in Ankara; Fronts in independency wars, economical resources; Abrogation of regency, Lousanne Treaty and its importance, National Economic Congress, the foundation of parties, the announcement of Republic; The acceptance of secular law, social and cultural reforms, economical improvements, secular education and science; Principles of Ataturk and Turkish Republic, its content and concept.

Turkish Language I (TRD121)

Perspectives on reality: the mechanist and universalist view of reality Development of Philosophical Ideas since Descartes Classical Physics: The Newtonian conception of the world Determinism, the logical structure of Newtonian mechanics Copenhagen interpretation of quantum theory Modern Physics: space, time and motion, Relativity Language and Reality in Modern Physics The Role of Modern Physics in the Present Development of Human Thinking; general evaluation of the course

Foreign Language I (English) (YDZI121)

Verb to be, possessive adjectives,guestions and negatives, present simple social expressions informal letter, there is , there are , how many , how much , this , that, directions, prepositions of place , some,any,these,those,linking words, can, can't,could, couldn't, formal letter, past simple regular verbs, irregular verbs, silent letters, special occasions take part in the content of subject.

History of Atatürk's Principles and Reforms II (ATA 122)

Turkish revolution and basic characteristics of Turkish revolution; The other revolutions that effected Turkish revolution; The aim of Turkish revolution: Democratic Law State; Establishment of secular Turkish secular law system; Establishment of Turkish secular education system Reconstruction of Turkish economy, national economic and globalization; Novelties that made the Turkish society contemporary General quality of Kemalist principles and republicanism; Nationalism; Etatism and Populism; Secularism; Revolutionism; Criticisms against Kemalist ideology and answers to them

Turkish Language II (TRD122)

Types of oral expression, kind of written expression.science research methods. How a book is to occur.

Foreign Language II (English) (YDZI122)

Past simple tense, count and uncount nouns, comparatives and superlatives, present continuous tense, going to, question forms, present perfect tense, ever and never, just and yet, present perfect and simple past tense

Physic I (FZK1001)

Vectors; motion in one and two dimensions; Newton's first law and inertial frames; Newton's second and third law; circular motion and other applications of Newton's laws; work and energy; potential energy and conservation of energy; linear momentum and collisions; kinematics of a rigid body; rolling motion, angular momentum and torque; static equilibrium and elasticity.

Physic II (FZK1002)

Electric fields; electric potential; capacitance and dielectrics; current and resistance; direct current circuits; magnetic fields; sources of the magnetic fields; faradays's law; inductance; alternating current circuits; RLC circuits; electromagnetic waves.

Analysis III (MAT 2011)

Sequences and series of functions, Pointwise and Uniform Convergence, Power Series, Taylor Series, Fourier Series, Improper Integrals

Introduction to Number Theory (MAT2021)

Integers, divisibility, prime numbers, modular aritmetic, linear congruences, polynomial congruences, primitive roots, quadratic residues, quadratic equation, arithmetic function

Differantial Equations I (MAT 2031)

Introduction to Ordinary Differential Equations. Methods of Solutions of First Order Equations. Graphical Solution. Exact differential Equations. Equations Made Exact by a Suitable Integrating Factor. Linear Equations of the First Order. Bernoulli and Riccati Differential Equations. Second Order Equations Solvable by First Order Methods. Linear Differential Equations. Linear Homogen Equations. Solution of Linear Homogeneous Differential Equations of Second Order with Constant Coefficients. Reduction of Order. Linear Nonhomogeneous Equations. Methods of Solutions of Linear Nonhomogeneous Equations. Solution of Cauchy - Euler Equations.

Differential Geometry I (MAT 3033)

Euclidean Space, Tangent Vectors, Directional Derivatives, Curves in Euclidean Space,1-Forms, Differential Forms, Mappings, Dot Product, Curves, The Frenet Formulas, The Frenet Formulas, Arbitrary Speed Curves, Covariant Derivatives, Frame Fields, Special Curves.

Matrix Theory (MAT 3024)

Gauss Elimination and Inverse Substitution. Nonsingular Systems of Initial Basic Submatrices. Methods of Factorizations. Lower, Upper Envelops and Band Matrices, Matrix Norms, Iterative Methods. Inverses of Matrices and Determinants, Determination of Eigenvalues and Eigenvectors.

Analysis IV (MAT 2012)

Functions of Several Variables, Limit, Continuity, Partial Derivatives , Chain Rule, maximum and Minimum Values of Functions of Two Variables, Differential, Exact Differential, Directional Derivatives, Lagrange Multipliers, Implicit Functions and Implicit Functions Theorem, Inverse Functions and Inverse Function Theorem, Curves, Multiple Integrals, Fubini's Theorem, Area and Volumes, Line Integrals, Green's Theorem

Abstract Algebra I (MAT 3021)

Groups, Symmetric groups, Subgroups, Cyclic Groups, remaining Class and Lagrange's Theorem, Normal Subgroups, Quotient Groups, Homomorphisms and isomorfhisms, Isomorphism theorems and conjugate Element, Direct Products, Cauchy's Theorem and p-groups

Differential Equations II (MAT 2032)

Series Solution of Differential Equations. Power Series. Analytic Coefficients Linear Equations.Singular points. Solutions in Singular point. Real and different exponents.Real and equal exponents. Bessel differential equations. Infinitiy point.Properties of Bessel functions. Systems of differential equations First order equation systems. Eleminasyon Method. Matrix Differential Equation Systems. Equations with constant coefficients. Equations with variable coefficients. Higer Order Equation Systems. Laplace transformation. Properties. Inverse transformation. Convolution Theorem. Solution of differantiel equation by Laplace transformation.

Differential Geometry II (MAT 3034)

Covariant Derivatives,Connection Forms,The Structural Equations,Surfaces on Euclidean Space,Patch Computations,Differentiable Functions and Tangent Vectors,Differential Forms on a Surface,The Shape Operator of Surface,Normal Curvature,Gaussian Curvature,Computational Techniques,Special Curves in a Surface,Ruled surface,Surfaces of Revolution.

Complex Function Theory I (MAT 3013)

Complex Numbers, Complex Functions, Limit and Continuity, Complex Derivative, Cauchy-Riemann Equations, Analytic Functions, Harmonic Functions, Elementary Functions, Cauchy's Integral and Derivative Formula, Liouville's Theorem, The Fundamental Theorem of Algebra, Morera's Theorem, Maximum and Minimum Modulus Principle, Zeros and Singular Points of Analytic Functions, The Residue Theorem and Applications

Abstract Algebra II (MAT 3022)

Rings, Subrings, Ideals, Homomorphisms, Isomorphisms, Theorems of Isomorphism, Field of fractions, Polynomial rings, Arithmetic in Rings, Unique factorization rings, Prime ideals, Maximal ideals, Primary ideals

Partial Differantial Equations (MAT 4061)

General definitions. Surfaces and Curves in three dimensions. One Parameter and Two Parameter Systems of Surfaces. Methods of Solutions of dx/P=dy/Q=dz/R Orthogonal Trajectories of a System of Curves on a Surface. Pfaffian Differantial Forms and Equations. Partial Differantial Equations of The First Order. Cauchy's Method of Caracteristics , Lagrange and Charpit's Method. Special Types of First Order Equations. Solutions Satisfying Given Conditions. Partial Differantial Equations of The Second Order. Reduce the Two Dimensional Equation to Canonical Form. Hyperbolic, Parabolic and Elliptic Equations. Fourier's Solutions. Wawe Equation and Diffision Equation.

Introduction to Numerical Analysis (MAT 3016)

Numerical Error Sources, Error Analysis for Linear Systems, Classifications of Numbers, Methods for Findings Fixed Points, Methods for Findings the Roots of Functions of One Variable, Order of Convergence and Methods for Accelerating Convergence, Methods of Solutions for Nonlinear Systems.

Complex Function Theory II (MAT 3014)

Complex Series, Complex Power Series, Taylor Series, Laurent Series, Infinite Product, Weierstrass's Theorems, Mittag-Leffler's Theorem, Special Functions; Complex Gamma, Beta and Riemann-Zeta Functions, Conformal Mappings, Mobiüs Mappings, Automorphisms of Disc and the Plane

Numerical Analysis (MAT 3016)

Numerical Integration and Differentiation. Initial Value Problems for Ordinary Differenrial Equations. Boundary Value Problems for Ordinary Differenrial Equations.

Probability (MAT 2052)

Set Theory, Permutation-Combination-Binomial, Probability Axioms, Intermittent and Continuous Random Variables, Distributions, Moment and Moment Derivative Functions

Topology I (MAT 4013)

Basic Notions Concerning Sets. Basic Set Operations, Indexed Sets. Relations, Equivalence Relations. Defining A function, Inverse Functions and Inverse Images. Finite and Infinite Sets, Countable Sets. Topological Spaces. Way of Generating A Topology. Closed Sets, Topologies Induced by Functions. The interior, Exterior and Boundary of A set, Cluster Points. Subspaces. Bases and Subspaces. Continuous Functions. Open Functions and Homeomorphisms. Topological and Hereditary Properties. Identification Topology. Separation Axioms.

Functional Analysis (MAT 4011)

Classic Inequalities, Metric Spaces, Normed Linear Spaces, Bounded Linear Operators, Linear Functionals and The Hahn-Banach Theorem, Baire Category Theorem and Its Consequences; Uniform Boundedness Principle, Open Mapping heorem, Inverse Function Theorem, Closed Graph Theorem

Statistics (MAT 4051)

It is an introductory course that assumes no prior knowledge of statistics. Basic statistical concepts and methods are presented in a manner that emphasizes understanding the principles of data collection and analysis rather than theory. Much of the course will be devoted to discussions of how statistics is commonly used in the real world.There are two major parts to this course: 1. Data – which includes graphical and numerical summaries to describe the distribution of a variable. 2. Probability and Inference – using the language of probability and the properties of numerical summaries computed from a random samples we learn to draw conclusions about the population of interest, based on our random sample, and attach a measure of reliability to them.

Real Analysis (MAT 4012)

Open and closed sets of real numbers. Continuous functions, Borel sets. Lebesgue Measure: Introduction. Outer measure. Measurable sets and Lebesgue measure. Measurable functions. Littlewood's three principles. The Lebesgue Integral: The Riemann integral. The Lebesgue integral of a bounded function over a set of finite measure. The linear spaces. The integral of a nonnegative function: The general Lebesgue integral. Differentiation: Differentiation of monotone functions. The classical Banach spaces: The Lp and lp spaces. The Hölder and Minkowski inequalities. Convergence and completeness. Bounded linear functionals on the Lp spaces.

Topology II (MAT 4014)

First axiom of Countability. Second axiom of Countability. Separable spaces. Compact spaces. Properties of compact spaces. Disconnected Spaces. Connected Spaces. More poperties of Connected Spaces. Finite Product Spaces. Base for a product space. Base for a product space. Finite product spaces and Second countability. Finite Product spaces and separability. Infinite product spaces. Hereditary and Topological proıperties in product spaces.

Mathematical Statistics (MAT 4052)

Classical probability theory; discrete and continuous random variables; distribution functions; expectation; law of large numbers; central limit theorem; other applications; random sampling; estimation of parameters; hypothesis testing.

Tensor Calculus (MAT 4070)

n-dimensional space. Transformation of coordinates. Covariant and contravariant vectors. Tensors of second order. Algebra of tensors. Symmetric and skew-symmetric tensors. Outer multiplication and contraction. Inner multiplication. Riemannian metric. Christoffel symbols and their properties. Covariant differentiation of tensors.

Insurance Mathematics (MAT 4057)

Insurance economics,Interest accounts, Life insurance: the survival distributions and life tables,Life insurance and life annotes, Net premiums, Net premium equivalents, Capital insurance: damage tables, Net premium of various capital insurances.

Projective Geometry (MAT 3035)

Euclidean Geometry and Other Geometry, Geometry; Euclidean geometry Various geometrical constructions, Primitive concepts, Affine planes, Projective planes Relationships between Afine and Projective planes and Lower planes, Other Geometrical constructions, Dezarg, Pappus and Fano planes, Dezarg planes, Papus planes, Projective planes on partition rings, Fano axiom: Projective planes that provide and maintain this axiom, Transformations in projective planes, Isomorphism, One Dimensional Transformations in Projective Planes, Perspectivity and Projections.

Mathematics and Nature (MAT 3092)

Zenon's paradoxes, Philosophical questions such as "Is there mathematics in nature, mathematical concepts being creation or discovery", Probability theory, Games, Geometry, Combinatorial calculations, Number theory, Arithmetic.

Foundation of Business (MAT 4067)

It is based on giving basic information, based on examples from the relevant literature and practice, on concepts related to modern management and business used in an enterprise.

History of Science (BSB 1015)

Science in old Age Evaluation of the science from the near - east cvilizations to untill now Civilization of Helen-İyon Science in period of Roma Science in Middle Age World of Christianity Science in Periods of İslamic and Turkish (Period of the World of eastern İslamic-Türk) Science in Periods of İslamic and Turkish (Period of the World of west ern İslam-Türk)İ Entrance of Turkısh people to Islamism and Scientific activities in that period Science in near Age The Renaissance and Science Scientific Revoluation and enlightenment Age Science in Ottomans (Period of modernist and traditionalist) Study of Science in near Age and western İn period of Turkısh Republic , science in Turkey

Introduction to Career (IK 4065)

To determine self-knowledge, values, vision and mission, brain work, career strategy development

Career (IK 4066)

To determine self-knowledge, values, vision and mission, brain work, career strategy development

Set Theory (MAT 3023)

Set Operations,Examples on set Operations,Continuation of Examples, Algebra of Sets, Boolean Algebra,Ordered Couples,Relations,Functions, Equivalence Relations,Equipotent sets, Cantor's Theorem,Characteristic function, simple function,Family of Sets,Lower and Upper limit sets, Continuation of Lower and Upper limit sets, Sequence of sets with couple indices, Examples

Introduction to Optimization (MAT 4063)

Vector Spaces an Matrices, Transformation, Unconstrained Optimization, Linear programming

Optimization (MAT 4064)

Vector Spaces an Matrices, Transformation, Unconstrained Optimization, Linear programming

Riemannian Geometry (MAT 4071)

Coordinate transformations, covariant and contravariant tensors, metric tensor, Riemannian metric , Riemannian spaces, Christoffel symbols, covariant derivative, Levi-Civita connection, curvature of any curve, geodesics, parallel shifting, geodesic and Riemannian coordinates, the Riemannian curvature tensor, Ricci tensor, some special Riemannian surfaces (Einstein, symmetric, recurrent spaces, ...), hypersurface, second fundamental form, Gauss and Mainardi-Codazzi equations.

Integral Equations (MAT 4046)

Introduction for integral equations, classification of integral equations. Linear and non linear integral equations, Fredholm and Voltera integral equations. Method of successive aproximations. Applications to ordinary differential equations.

Community Service Practices (THU 100)

Pre-instruction for Developing Projects Determinig the Issue of Project and Planning Developing Projects Performing Projects Presentation of Projects Evaluation of Projects

History of Mathematics (MAT 3038)

Early number systems and symbols.Mathematics in early civilizations, Egyptian mathematics. Mathematics in early civilizations, Babylonian mathematics. Mathematics in early civilizations, Babylonian mathematics. Beginnings of Greek Mathematics. Alexandrian School: Euclid. Euclid and the elements. Euclid's number Theory. Eratosthenes. Archimedes. Estimating the value of pi. Apollonius of Perga:The Conics

Introduction to Special Functions (MAT 4047)

Special functions related with the Gamma function. Laguerre equation and its solution. Generating function. Orthogonality properties of Laguerre polynomials. Recurrence relations between Laguerre polynomials and their derivatives. Hermite equation and its solution. Generating function. Orthogonality properties of Hermite polynomials. Recurrence relations between Hermite polynomials and their derivatives. Chebyshev differential equation and Chebyshev polynomials. Gegenbauer and Jacobi polynomials. definition of Hypergometric function and relation between hypergeometric function and other special functions.

Special Functions (MAT 4048)

Special functions related with the Gamma function. Laguerre equation and its solution. Generating function. Orthogonality properties of Laguerre polynomials. Recurrence relations between Laguerre polynomials and their derivatives. Hermite equation and its solution. Generating function. Orthogonality properties of Hermite polynomials. Recurrence relations between Hermite polynomials and their derivatives. Chebyshev differential equation and

Chebyshev polynomials. Gegenbauer and Jacobi polynomials. definition of Hypergometric function and relation between hypergeometric function and other special functions.