

**FIRAT UNIVERSITY FACULTY OF TECHNOLOGY CIVIL ENGINEERING
COURSE CONTENTS**

Semester I

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
TRD109	Turkish language I	2	0	2	2
Course content					
The Concept of Language, The place and importance of language in social life as a social structure, Language-culture Relationship, Culture-civilization relationship, The place and historical development of Turkish among the world languages, Art-creativity and society, Grammar of Turkish Turkish (Sound features and sound characteristics of Turkish) information, syllable information, spelling rules and application, punctuation marks and application). Total 36 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
YDİ107	Foreign Language (English)-I	2	0	2	2
Course content					
Greetings, names, and ages. Numbers. Days, months and seasons. This is, that isWhat time is it. Action in Progress, Who ?, What ?, Where. Talking about present habits, ideas, opinions. Propositions of time: at, on, in; Talking about schedules and calendars.Abilities and inabilities: can, can't.A family tree. Possessive pronouns. Family members. Obligations prohibitions and lack of necessity: must, mustn't. Obligations prohibitions and lack of necessity: don't/ doesn't have to. Total 36 hours studied.					
CODE	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
MAT161	Mathematics-I	4	0	4	6
Course content					
Numbers, Complex numbers, Definition of functions, types, special functions. Trigonometry, Hyperbolic functions, Limit, Continuity, Derivative, Maximum and Minimum Problems. Graphic drawings, coordinate systems, differential of functions. Integral calculus, indefinite integration methods, Definite integral, Area-volume calculations, area between curves, arc length, center of gravity and finding the moment of inertia, Matrices and their types, Rank operation in matrices, Determinants, Systems of linear equations, Cramer's theorem. Total 72 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
FİZ111	Physics -I	3	0	4	6
Course content					
Measurement Knowledge, Vectors, Motion on Line, Motion in Two or Three Dimensions, Newton's Law of Motion, Applications of Newton's Law. Work and kinetic energy, conservation of energy and potential energy. Multiparticle systems and center of mass. Linear momentum and collision, rotational motion, rolling motion and angular momentum. Universal law of attraction, static balance and flexibility. Vibration motion and waves, harmonics, applications. Total 54 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
KİM105	Chemistry	2	0	4	6
Course content					
Chemistry and matter, atom and its structure. Periodic table and energy levels. Chemical bonds. stoichiometry. Properties of gases, liquids and solids. Properties of solutions. Chemical reactions, chemical equilibrium, reaction kinetics. Acids, bases and pH calculations. Electrochemistry, chemical thermodynamics. Properties and chemical investigation of conductor, insulator and semiconductor materials. Total 36 hours studied.					

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Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT101	Introduction to Civil Engineering	2	1	1	1
Course content					
What does a Civil Engineer do, its place among professions, architect-engineer relationship, interdisciplinary relationship, the history of the profession, the history of professional knowledge, areas of responsibility, Building department and areas of interest (high-rise buildings, prefabricated structures), transportation department (Highways, railways, bridges, tunnels)) and areas of interest, geotechnical department, mechanics department, hydraulic department, (Dams , Pipelines , Construction equipment) civil engineering project management, construction site and academicianship, professional documentary film screening, civil engineering education process, professional and social lifelong learning awareness and maintenance skills, contemporary problems and solutions, professional ethics and sense of responsibility, understanding the effects of engineering solutions in universal and social dimensions. Total 54 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT103	Construction Drawing	2	2	3	3
Course content					
Drawing Tools and Their Use / Standard Text and Numbers / Line Technique / Polygon Drawings / The Concept of Scale and Dimensioning / The Concept of Projection / The Concept of Perspective / Point, Line and Planes / Projection of Objects / Studies on Plans, Sections and Appearances / Necessary in Project and Application Project Studies Studies on the Rules / Taking Horizontal and Vertical Sections. Total 72 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
FİZ105	Physics Lab	0	2	1	2
Course content					
Basic measurements. Movement with Constant Acceleration. Conservation of linear momentum. Balance experiment. Friction experiment. Rotation dynamics. Simple harmonic motion. Oblique shot. Elastic and inelastic collision. moment of inertia. Centripetal acceleration. Physical pendulum. Total 36 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
KİM109	Chemistry Lab	0	2	1	2
Course content					
Chemical equilibrium, purification by crystallization, product of solubility of a sparingly soluble solid determination, the effect of concentration on the reaction rate, the effect of temperature on the reaction rate, oxidation reduction reactions, copper bridging by electrolysis, soap test, simple nickel analysis applications. Total 36 hours studied.					

Semester II

Code	COURSE TITLE	THEO	PRATICAL	CREDIT	ECTS CREDIT
TRD110	Turkish Language-II	2	0	2	2
Course content					

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Composition Information. Types of Literature. Scientific research and writing methods, spelling rules. Punctuation. Elements of the sentence, sentence analysis and application. Studies on expression and sentence disorders. Total 36 hours studied.

Code	COURSE TITLE	THEO	PRATICAL	CREDIT	ECTS CREDIT
YDİ108	Foreign Language (English)-II	2	0	2	2

Course content

Possession (have, has got). There is, there are, quantitative adjectives. Prepositions (under, near, next ...). Making suggestions (let's, shall, would ...). Asking for help (can you ...). Adverbs of Frequency (never, always, often ...). Present cont. Tense. General exercises on the previous subjects. General exercises on the previous subjects. Simple past tense. Exercises with regular and irregular verbs on Simple past tense. Past use of verb "to be" with affirmative, negative and interrogative forms. General revision and exercises. Total 36 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
MAT162	Mathematics II	4	0	4	6

Course content

Solution of systems of linear equations with the help of matrices, Vectors and their operations, vector space. Linear transformations. Analytical geometry. Series. Series expansions of functions, Taylor and Maclaurin series. Multivariable functions, limit in multivariable functions, continuity, partial derivative. Derivatives of exact (sum) differential, compound, implicit and inverse functions. Maximum and minimum point operations in multivariable functions, application of partial derivatives. Jacobians, multiple integrals. Area and volume calculations, surface integral. Gradient, Divergence, Rotational and Laplace concepts. Total 72 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
FIZ112	Physics -II	3	0	3	5

Course content

Coulomb's Law, Electric Field, Gauss's Law, Faraday's Law, Electric Potential, Current and Resistance, Direct Current Phases, Magnet Field, Magnetic Properties Affecting Current Carrying Conductors, Magnetic Field and Magnetic Properties of a Current, Induction Electromotive Force, Capacitance,

Properties of Dielectrics, Induction and Transients, Alternating Currents and Electromagnetic Waves. Total 54 hours studied.

Code	COURSE TITLE	THEO	PRATICAL	CREDIT	ECTS CREDIT
İNT102	Computer Aided Drawing- CAD	2	2	3	5

Course content

Introduction of operating system and drawing package programs, Commands for geometric drawings, points, lines, curves and polygons, Scale and dimensioning, Writing operations and scans, Drawing of simple construction projects and details designed using the package program, Printing from a printer/plotter. Total 72 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT104	Statics	3	0	3	5

Course content

Structural systems and solution methods, loads and load trains, temperature changes, shrinkage, creep etc. arising from the viscoelastic structure of the material. Support collapses, movable, fixed, fixed supports, nodes and moment (M), horizontal force (H), vertical force (V), support reactions, plane and space states in carrier systems and M, N, V internal forces, ground and deformation concept, normal/shear force, bending/torsion moment, solid body straight and curved axis rod systems, frames, cage systems and suspended systems, lines of influence in solid body rod systems. Total 54 hours studied.

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Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT106	Material Science	3	0	3	4
Course content					
Structure of atoms, atomic bonds. Crystal and amorphous structures. Crystal defects. Material and its internal structure, physical and chemical properties of materials, mechanical properties of materials, technological properties of materials, effects of environmental and usage conditions on the material, deformation and stress of materials, strain and time relations, periodic loading and fatigue, safety stresses and reliability, material information statistical methods. Total 54 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
FİZ106	Physics Lab II	0	2	1	2
Course content					
Basic measurements and Ohm's law. Oscilloscope and signal generator. Electric field lines. Kirchoff's law and Wheatstone bridge. Variable current circuits. One sigacm loading and unloading. RC circuits. RL circuits. Determination of the e/m ratio of the electron. Transformer. Total 36 hours studied.					

SEMESTER III

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
AİT209	Princ. of Atatürk and Hist. of Rev.	2	0	2	2
Course content					
The purpose of studying the Turkish Revolution History and Kemalism course and the concept of revolution, the collapse of the Ottoman Empire and the reasons that prepared the Turkish revolution, the disintegration of the Ottoman Empire, the Armistice of Mudros and subsequent events, the state of the country against the occupations and the reaction of M. Kemal Pasha, M. Kemal Pasha The Pasha's departure to Samsun and the opening of the Last Ottoman Parliament, the opening of the Turkish Grand National Assembly and his taking over the administration of the War of Independence Total 36 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT201	Construction Materials	3	0	3	4
Course content					
Classification of structure materials, Calcium-based binders, Alci, lime and cements, Hydration of Portland cement, experiments on cements, Cement types produced in Turkey, Classification of aggregates, Harmful substances in aggregates, Physical and mechanical properties of aggregates, Aggregate granulometry, Properties of fresh concrete , Workability, Weathering, water vomiting and uniformity, Experiments on fresh concrete, Mixing water, Chemical additives in concrete, Mineral additives, Properties of hardened concrete, Factors affecting the strength of concrete, Presentation of concrete, Rot of concrete, Durability of hardened concrete, Concrete mixture calculations. Total 54 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT203	Topography and Applications	2	2	3	4

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Course content					
Shape of the earth, measured quantities and error sources, determination of points and lines in the field (jaloning), length measurements and errors in length measurements, Angle measuring instruments, Horizontal and vertical measurements, Vertical descending and ascending tools and methods, Location plans, coordinate calculations, Area calculation methods, Planimeter, Correction of broken boundaries, Division of areas, Application. Definition of height systems, Geometric leveling measurement principle, Introduction of levels and slats, Moving elevation from one point to another, open closed and connected leveling polygons, Leveling summary chart, Regular error affecting geometric leveling sources, definition of topography. Units of measure. Measurement errors, classification of maps. Determination of points and lines in the field with scale. Measuring lengths. Up and down vehicles. Common parts in topography instruments. Theodolite. Angle measurement methods. Polygon arrays. Measuring height differences. Using the level and evaluating its measurements. Extraction of longitudinal and transverse sections in the field. Tachometric measurements and drawing of the plan. Demonstration of the earth. Area and volume calculations. Application measurements. Measuring Error and Balancing. Total 72 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT205	Dinamics	3	0	3	5
Course content					
Kinematics and kinetics of the particle. Inertia frame. Newton's Laws. Impulse and momentum. Work force field. Potential and kinetic energy. Resistant movement. Vibration. Planar motion. Total 54 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT207	Building Information	2	2	3	4
Course content					
Introduction to building information. Definitions. Construction process and operations. Project preparation and its principles. Building site organization, foundation soil and mechanical properties. Fortification Works. Rope scaffolding and foundation application. Bearing elements and their principles (foundation, column, curtain column-wall, beam, floor, staircase, retaining walls). Complementary elements and their essentials (walls, partitions, doors, windows, roofs, chimneys, surface coatings, tin works, dilatation joints). An example build project file preparation (works on architectural drawing and practical calculation). Total 72 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT209	Sterngth of Materials I	3	0	3	5
Course content					
Hooke's law, modulus of elasticity, Poisson's ratio, strength hypotheses, general principles of sizing, moment of inertia for compound sections, radius of inertia, moment of strength, normal and shear forces, torsion, bending, buckling and their combined states stress, displacement/strain and sizing accounts. Solidification, section (separation), equivalence, Saint-Venant, principles of superposition, definition of structural systems, units, stress, components of internal forces, calculation of internal forces, relations between loads, shear force and bending moment, and a particular method of integration, stress and strain states, equilibrium calculations, volume change, Stress state and stress tensor. Shapeshifting. Linear elasticity. Hooke's laws. Plasticity, strength hypotheses. Section effects and diagrams in bars. Total 54 hours studied.					

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Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
MAT215	Linear Algebra	2	0	2	4
Course content					
Proof Methods, Sentence Theory, Relations, Functions and Operations, Group, Ring, Field, Vector Spaces, Matrix and Matrix Spaces. Total 36 hours studied.					

Social Elective Course I

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İŞL451	Entrepreneurship I	2	0	2	2
Course content					
What is entrepreneurship? Entrepreneurship and economic development. Evaluation of entrepreneurship in Turkey. Total 36 hours studied.					

SEMESTER IV

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
AİT210	Princ of Ataturk and Hist. of Rev. II	2	0	2	2
Course content					
Abolition of the caliphate, Progressive Republican Party and the period of Reconciliation, Educational Revolution, Cultural Revolution, Alphabet reform, Turkish historical revolution, Turkish language revolution, Izmir economic congress, Multi-party system, Revolution in the field of women's rights, Hat, costume and clothing revolution , The foreign policy of the Republic of Turkey, Atatürk's principles, political events, the relations between the government of the Turkish Grand National Assembly and the government of Istanbul, Military developments, the Treaty of Kars, the Ankara agreement, the Great offensive, the Armistice of Mudanya, the abolition of the Ottoman sultanate, the Lausanne peace treaty. Total 36 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT210	Construction Technologies and Applications	2	2	3	5
Course content					
Historical development of the structure, construction systems, grounds and features; types, bearing capacity and behavior on the foundation, construction site layout, construction equipment and the places where it is used, rope scaffolding and foundation application, excavations and holding structures, foundations, columns, walls, floors, stairs, roofs, chimneys, reinforced concrete formwork systems and their details, examination of architectural projects and construction details. The definition of fine construction and the importance of fine construction according to the place of construction, fine construction elements, construction processes, flooring, wall and ceiling coverings, joinery, exterior cladding, water, heat, sound, vibration and fire insulation in buildings, tinsmithing works and everything related to the mentioned subjects. construction details. Total 72 hours studied.					

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Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT202	Building Physics	2	1	3	2

Course content

Building physics-material relationship, mechanical, water-moisture, sound and heat effects in the building, problems caused by these effects and suggestions for solutions. Details of water-moisture, sound and heat insulation in buildings, insulation materials. Sound and heat insulation calculations. Total 54 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT206	Sterngth of Materials II	3	0	3	4

Course content

Shear bending, dislocation center. Examining the elastic curve with various methods, the effect of shear. Normal force and bending, core, non-tensile material, second order theory. Bending torsion. Virtual work theorem, Betti and Castigliano theorems, minimum principles. Elastic stability, Euler states, buckling outside the elastic region, Omega method, approximate methods, Rayleigh ratio. Total 54 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT208	Fluid Mechanics	3	0	3	4

Course content

Login. Units and unit systems. Fluid properties. Statics of fluids. hydrostatic pressure. Hydrostatic pressure forces on plane and curved surfaces. Fluid kinematics. Lagrange and Euler methods. One, two and three dimensional currents. Fundamental equations of one-dimensional flow of ideal and real fluids. Laminar and turbulent flows, two-dimensional flows of ideal and real fluids. Reciprocating and cyclical currents. Total 54 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT204	Building Statistics-I	3	1	3	5

Course content

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
	General information, Assumptions made in building statics, Structural systems and solution methods, Loads and load trains, temperature changes, shrinkage, creep etc. arising from the viscoelastic structure of the material. and support collapses, Movable, fixed, fixed supports, nodes and moment (M), horizontal force (H), vertical force (V) support reactions, Plane and space states and M, N, V internal forces in carrier systems, Ground and the concept of deformation, normal/shear force, bending/torsion moment, Solid body straight and curved axis rod systems, frames, cage systems and suspension systems, Lines of influence in solid body rod systems. Total 72 hours studied.				
MAT220	Differential Equations	4	0	4	6

Course content

First Order Ordinary Differential Equations and Engineering Applications, Linear Differential Equations and Engineering Applications, Green's Functions, Introduction to Linear Algebra, Simultaneous Linear Differential Equations, Finite Differences, Mechanical Systems and Electrical Circuits, Fourier Series and Integral, Laplace Transform. Partial Differential Equations, Derivation of Equations, D'Alembert

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Solution of Wave Equation, Separation Method, Numerical Solution of Partial Differential Equations, Bessel Functions and Legendre Polynomials, Vector Spaces and Linear Transformations, Vector Analysis, Calculation of Variation, Analytical Functions with Complex Variables. Total 72 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
IST234	Probability and Statistics	2	0	3	4

Course content

Counting techniques; multiplication rule, Permutation, Combination. The concept of probability; Sigma algebra, axioms of probability, Conditional probability, Bayes' Formula. random variable; distribution function, probability function, Chebyshev Inequality. Discrete and continuous distributions; Uniform distribution, Bernoulli distribution, Poisson distribution, Geometric distribution, Hypergeometric distribution, Normal distribution, Exponential distribution, Gamma distribution, Beta distribution. Subtracting functions. Decision theory. Prediction concept. Hypothesis testing. Nonparametric tests. Correlation and regression. Engineering applications. Total 36 hours studied.

V.YARIYIL

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT301	Soil Mechanics	2	2	3	4

Course content

Physical and index properties of soils. Classification. compaction. Hydraulic properties, capillarity, permeability, freezing effect. Effective, neutral and total stresses. Stress-strain relation in soil. Stress distribution. Consolidation. Slip resistance. Earth pressures. Base pressure distribution in shallow foundations, rigid and bendable foundations. Stress distribution in soil. Consolidation theory. Finding the coefficient of consolidation by logarithm-time and root-square-time methods. Drained and undrained installations on floors. Settlement calculations for these loading cases. Seating calculations and allowable seating limits in structures. Two-dimensional infiltration problem. Stream networks. Flow networks and their applications in soil mechanics. Slope stability. Total 72 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT303	Hydraulic	3	0	3	4

Course content

Local energy losses, parallel and series connected piping, multiple treasury, pumped piping, nozzle (orifice) and flow coefficient, emptying time of tanks, open channel current and its types, open channel current formulas, specific energy concept, Froude number and flow regime, channel section changes, pipe and open channel flow measurements (weirs, velocity and flow measurement devices), dimensional analysis, basic principles of modeling, drag force applied to objects in flow and laboratory experiments Impulse-Momentum equation and its applications . Dimensional Analysis and similarity. Movement of real fluids. Laminar and turbulent flows. Pipe flows. Local load losses. Pipe network calculation. Balance chimney oscillation and water hammer calculation. Non-uniform currents in open channels. Forces acting on objects immersed in current. Total 54 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT305	Building Statics-II	3	1	3	5

Course content

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Virtual work theorem. Mohr method. Hyperstatic systems, degrees of hyperstaticity and properties of hyperstatic systems, Loads acting on hyperstatic carrier system and analysis methods, Solution methods of hyperstatic systems and properties of methods, Solution of hyperstatic systems according to vertical forces, Solution of hyperstatic systems according to horizontal forces, Package programs in solutions of hyperstatic systems. Total 72 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT307	Transportation	3	0	3	4

Course content

Road and road traffic terms; crossing, plan, boy-section, infrastructure, superstructure, foundation, sub-base, pavement, slope, transverse, longitudinal slope, traffic lane, lane line, parking lane, climbing lane and expropriation width etc., driver and pedestrian characteristics, vehicle characteristics , View lengths, tracking interval, change in traffic, basic relationships in traffic flow, Geometric standards and their selection, project speed, project traffic, annual average daily traffic, traffic forecast, Capacity and service level; influencing factors, service flow rate and correction factors, service flow rate on roads, service level selection, calculations of elements related to highway geometry; horizontal and vertical curve calculations, section calculations, selection of basic and sub-base materials, aggregate and bituminous mixture methods. Total 54 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT309	Foundation Construction	2	1	2	4

Course content

Foundation construction terms, evaluation of laboratory and field test results, bearing capacity parameters of foundation soils, consolidation and sudden settlement parameters, design of building foundations, simple retaining structures, materials used in foundation construction. Drilling, securing and protecting against water in foundation pits. Securing surrounding structures. Foundation soil improvement methods. Basic systems. Bearing capacity and settlement calculations of shallow foundations. Bearing capacity and settlement calculations of deep foundations. Foundation soil investigations in the field. Preparation of geotechnical report. Safety number selection and ground safety stress concept in BS-AIJ-DIN-ASTM standards. Superficial and deep foundations. Deep excavation techniques. Injection general information, methods and applications. Special foundation problems. Total 54 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT311	Materials Laboratory	2	2	3	5

Course content

Structure materials, chemical (Acids, bases and salts), physical (Unit weight, density, porosity, compactness, water absorption, capillarity, permeability, saturation degree, volume change), mechanical (tensile, pressure, impact, bending, buckling, torsion) Gain knowledge and skills on evaluation of results and preparation of reports by testing their technological (abrasion, hardness, fatigue, creep, fracture) properties. review of structure materials, material loading systems and loading principles, load application methods, loads on frames (cages), load distribution, safety controls, strain measurement systems, measuring the volume of an object by immersion in water, as a basis for technology and experiment construction, rotation and rolling movements, calibration, measurement of soil properties. Construction test techniques, laboratory tests applied to construction materials, test methods and calculations, evaluation of test results. Total 72 hours studied.

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Technical Elective Course I

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT315	Timber Structures	2	0	2	2
Course content					
Microscopic structure of wood material, Macroscopic structure, Chemical structure, Physical properties of wood material, Mechanical properties of wood material, Important wood species The importance of water-moisture relationship and drying of wood, Natural aspects and disadvantages of wood, Causes of deterioration of wood, Corruption caused by fungi in wood material, Living conditions of fungi, Types of fungi that damage wood material, Decay and color changes in wood due to fungi, Deterioration of wood material caused by insects, Living conditions of insects, Types of fungi that damage wood material, Physical deterioration in the structure of wood, Chemical deterioration in the structure of wood, Deterioration due to heat in its structure, Materials used to protect and save wood, Wood Production Methods, Materials used in wood conservation, Wood preservation methods, Fungi protection methods, Insect protection methods. Total 36 hours studied.					

TEKNİK SEÇMELİ DERS II

İNT325	Durability of Concrete	2	0	2	2
Course content					
Concrete; Importance of Durability in Concrete, Its Relationship with Strength, Factors Affecting the Durability of Concrete, Design of Concrete According to Durability, Effects of Concrete's Water Permeability and Durability, Vapor Permeability of Concrete, Flowering and Its Effects on Durability, Effect of Carbonation on Durability, Effect of Sea Water, Alkali Aggregate in Concrete, Freezing in Concrete /The Effect of Dissolution, Corrosion of Reinforcement and Its Causes, Measures to be Taken Against Rebar Corrosion. Total 36 hours studied.					

VI.YARIYIL

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT302	Transportation Project	1	2	3	3
Course content					
Road design criteria, AASHTO road design and principles. Route creation and research. Examination of sample road-transportation projects. Principles of construction and preparation of transportation projects with different purposes and functions. Designing flexible and rigid pavements. Preparation of a sample transportation project file. Total 54 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT304	Reinforced Concrete I	3	1	4	6

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Course content					
Definition of concrete and reinforced concrete. Basic principles for calculation and the concept of building safety. Bearing capacity of the elements under the effect of axial force and reinforcement calculation of rectangular and circular columns. Bearing capacity of the members under the effect of simple bending and reinforcement calculation of rectangular and plate beams. Bearing capacity of the elements under the effect of axial pressure and oblique bending, and reinforcement calculation of rectangular and plate beams under the effect of oblique bending. Behavior of shear-reinforced and unreinforced beams. Calculation of triangular or trapezoidal beams. Torsional and punching effect. Study of TS 500, BS 8110, ACI 318, DIN 1045 and CEB 78 standards. Total 72 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT306	Hydrology	2	1	2	4
Course content					
Definition of Hydrology, Its Place and Importance in Water Engineering, Hydrological Cycle, Reservoir Operation Studies, Precipitation, Evaporation, Transpiration and Plant Water Requirement, Infiltration, Groundwater, Surface Flow, Flood Hydrology, Statistical and Probabilistic Analysis of Hydrological Processes. Total 54 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT308	Construction Cost	3	1	3	5
Course content					
Stages of preparation for the structure, Laws and regulations related to construction, Work schedules, Site organization and production methods, Books used in the construction site, Job acceptance and finishing processes, Occupational health and work safety in building production. Bidding processes, estimation techniques, material procurement schedules, documents required for a tender contract, ubiquitous contract forms and their suitability for the job, development of a contract, importance and planning and control of site management, and keeping records of works, Starting from the stage of receiving proposals, preparation of bills of quantities, explorations, principles of construction site organization, preparation of programs (Gantt-CPM and PERT), safety measures in construction site works, financing and cost analysis. Total 72 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT310	Concrete Technology	3	0	3	4
Course content					
Concrete and concrete mix calculations. Special purpose concrete construction chemicals. retarders and accelerators. Lightweight or air-entraining concretes, high-strength concrete production. Mass concrete and pouring techniques. Ready-mixed concrete and equipment. Pumpable concrete and properties. Concrete testing equipment. Damaged and undamaged concrete inspection method. Laboratory experiments and site visits. Total 54 hours studied.					

Social Elective Course II

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İŞL452	Entrepreneurship II	2	0	2	2
Course content					

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Project support organizations. Innovation. Scientific activities in entrepreneurship. The process and basic steps of starting a business. Application studies. Total 36 hours studied.

Technical Elective Course III

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT328	Concrete Laboratory	2	2	3	4
Course content					
Building materials, chemical (Acids, bases and salts), physical (Unit weight, density, porosity, compactness, water absorption, capillarity, permeability, saturation degree, volume change), mechanical (tensile, pressure, impact, bending, buckling, torsion) , slip, shear and rupture), technological (abrasion, hardness, fatigue, creep, fracture), testing the results of the evaluation and report preparation to gain knowledge and skills. Material loading systems and loading principles, load application methods, loads on frames (cages), load distribution, safety controls, based on the review of construction materials, technology and experimentation, strain measurement systems, measuring the volume of an object by immersion in water, rotational and twisting movements, calibration, measurement of soil properties. Construction test techniques, laboratory tests applied to construction materials, test methods and calculations, evaluation of test results. Total 72 hours studied.					

Technical Elective Course IV

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT330	Structure and Environment Relationship	2	0	2	2
Course content					
Building, Environment, Building and environmental relations, The effects of construction on the environment and the environment on construction, Environmental law, Law on cultural and natural assets, Protection of coasts, Ecological balance and building relations. Total 36 hours studied.					

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COURSE CONTENTS**

Semester VII

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT401	Workplace Training	5	0	5	5
Course content					
Throughout the seventh semester, students will receive on-the-job training in the relevant sector. Total 90 hours studied.					
	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT403	Workplace Training Application	0	15	8	15
Course content					
Throughout the seventh semester, students will receive on-the-job training in the relevant sector. Total 270 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT405	Professional Practice I	0	2	1	5
Course content					
At the end of the 4th semester, the 20 working days of the construction site internship and the 20 working days of the office internship at the end of the 6th semester are evaluated and decided during this period. Total 36 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT407	Professional Practice II	0	2	1	5
Course content					
At the end of the 4th semester, the 20 working days of the construction site internship and the 20 working days of the office internship at the end of the 6th semester are evaluated and decided during this period. Total 36 hours studied.					

Social Elective Course III

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT423	Ergonomics Engineering	2	0	2	2
Course content					
Definition of ergonomics. Historical development process and scope. Basic elements of work and industrialization effect. Factors affecting people's adaptation to work. Human performance relationship (psychological factors, physical conditions (heat, sound-noise, light-illumination), age, gender effect, anthropometric data, etc.) Classification of work based on energy. Workload. Work tempo-fatigue and break times, the effects of environmental factors and work spaces on business life and ergonomic space arrangements. Appropriate posture criteria in the working environment. Ergonomic use of machines (ergonomics and work study). Monotony and safety at work. Total 36 hours studied.					

Semester VIII

**FIRAT UNIVERSITY FACULTY OF TECHNOLOGY CIVIL ENGINEERING
COURSE CONTENTS**

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT410	Graduation Project	0	2	1	5
Course content					
Determination of the project topic. Making the design and necessary calculations. Preparation of theoretical, experimental and/or computer-based graduation projects related to these subjects in order to educate students on selected subjects related to manufacturing. Preparation of complete and detailed drawings of the determined project. Creation of action plans. Making preparations for the manufacture of the parts of the project. Total 36 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT412	Earthquake Engineering	3	0	3	4
Course content					
Epicentr. hypocentral. Earthquake waves. Measuring ground movement. earthquake zone. Violence and isotherm curves. Magnitude and earthquake energy. Single degree of freedom systems. The equation of motion. Undamped and damped vibrations. Undamped and damped forced vibrations. Vibration isolation. Vibration measuring instruments. Systems under the influence of transient force. General solution. Earthquake strain. Two degree of freedom systems. Undamped vibrations. Vibration dampers. Earthquake action and response. Strong ground movements. Numerical operations for the spectrum. Elastic spectrum. Ground velocity and displacement. Earthquake design of buildings. Design philosophy. Turkish regulation on the protection of buildings against earthquakes. Total 54 hours studied.					
Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT414	Steel Structures and Design	2	2	3	4
Course content					
Properties, advantages and disadvantages of steel structures. Application areas of steel structures. Material of steel structure bearing elements. Steels. Steels with A3 carbon and additives. Mechanical properties of steels. Methods of improving the mechanical properties of steels. Characteristics of steels working under load. Rolling products. Principles of calculation of steel structures. Boundary states of the structural system. Calculation models, loads and factors. Dangerous cargo combinations. Steel structure combinations. Calculation and formation of welded joints. Knuckles, corners and pressure welds. Welding technology. Inspection of weld seams. bolted connections, bolted connections study, calculation and formation. High strength bolted connections. Riveted joints. Pull rods. Formation and calculation of drawbars. Pressure bars. One-piece pressure Formation and calculation of rods. Formation and calculation of multi-part pressure bars with gaps between their parts. Structural elements trying to bend. Formation of full body beams. full bodied Calculation of beams taking into account their elastic and plastic deformations. Formation and calculation of profile beams. Formation of steel structural elements under the effect of bending and pressure together and calculation. Total 72 hours studied.					

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT416	Reinforced Concrete-II	3	1	4	5
Course content					

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COURSE CONTENTS**

Reinforced concrete beam slabs. Theoretical and TS 500 method analysis and reinforcement calculation of plates according to various types of support. Analysis and reinforcement calculation of ribbed, hollow, cassette and cork floors. Stapling effect on plates. Calculation methods of shallow foundations. Singular foundations, continuous foundations in one and two directions. Radiogeneral foundations. Calculation of structures under horizontal loads. Calculation of frame systems under the influence of earthquake and wind loads. Calculation against the torsion effect of structures in the ground under the effect of horizontal loads. Total 72 hours studied.

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT418	Water Resources and Design	2	2	3	4

Course content

Stream morphology (classification of streams, characteristics of stream and basin, location of stream bed, length and cross-section analysis). Solid matter in streams (sediment characteristics, bottom shape) formation, initiation of movement, sling, swab and total solids calculation approaches, measurement techniques). Stream regulation structures (building materials and elements, protection, narrowing and other regulation structures). Moorings (side, opposite, bottom water intake structures, gravel passage and drop pond, as well as hydraulics of full bodied and capped moorings). Irrigation and drying (irrigation water demand, open channel, canal, pipe networks, rotation, demand, conditional demand, unit area unit water systems). Total 72 hours studied.

Technical Elective Course V

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT432	Water Supply and Environment Health	2	0	2	2

Course content

Water Consumption. Water resources and design. Water transmission and project design. Drinking water tanks and project design. Drinking water distribution and network calculation. Environmental health facilities. Planning and projecting of used centers. Water hammers and air boilers. Side weirs. Rainwater retarder tanks. Drinking water disposal. disinfection. Waste water and its causes, protection structures and construction technology, collection structures, treatment plants and techniques, chemical treatment additives. Drinking water supply and evaluation of waste water. Water treatment technique and technology. Total 36 hours studied.

Technical Elective Course VII

Code	COURSE TITLE	THEO.	PRATICAL	CREDIT	ECTS CREDIT
İNT442	Soil Improvement Methods	2	2	3	4

Course content

Preload method, vertical sand drain method, stabilization with lime and cement, deep compaction, vibroflotation, grouting, stabilization with geotextiles etc. Total 72 hours studied.