FINAL INTERNATIONAL UNIVERSITY
FACULTY OF ENGINEERING

Program	Civil Engineering (English)
Medium of Instruction	English

Category		**Associate Degree**	**X**	**Undergraduate**		**Masters (Project Based)**		**Masters (Thesis)**		**PhD**

CURRICULUM

ABBREVIATIONS

UC: University Core **FC:** Faculty Core **AC:** Area Core
UE: University Elective **AE:** Area Elective

YEAR 1

FALL

Semester	Course code	Course name	Course Category	Credit			Pre-requisite	ECTS Credits
				Lec.	Pract.	Tot.		
1	MATH101	Calculus I	FC	4	1	4	-	6
1	PHYS101	Physics I	FC	3	2	4	-	6
1	CHEM101	Chemistry	FC	3	2	4	-	6
1	ENGL101	English I	UC	3	0	3	-	6
1	CVIL101	Intro. to Civil Eng.	AC	1	0	1	-	2
1	COMP103	Information Technology and Applications	UC	2	1	2	-	3
Total Credit						**18**		**29**
SPRING								
2	MATH102	Calculus II	FC	4	1	4	MATH101	6
2	MATH104	Linear Algebra	FC	3	1	3	-	5
2	PHYS102	Physics II	FC	3	2	4	PHYS101	6
2	ENGL102	English II	UC	3	0	3	ENGL101	6
2	CVIL102	Engineering Drawing	AC	2	2	3	-	4
2	COMP106	Computer Programming	UC	3	2	4	-	5
Total Credit						**21**		**32**
YEAR 2								
FALL								
3	MATH205	Differential Equations	FC	4	1	4	MATH101 MATH104	6
3	CVIL215	Basic Mechanics - Statics	AC	4	0	4	PHYS101	6
3	CVIL223	Materials Science	AC	3	1	3	CHEM101	5
3	CVIL237	Geology and Surveying	AC	3	2	4	-	6
3	ENGL201	English III	FC	2	0	2	ENGL102	4
3	GEED-01	General Education Elective-I	UE	3	0	3	-	4
Total Credit						**20**		**31**

SPRING								
4	MATH206	Probability and Statistics	FC	3	1	3	MATH102	5
4	CVIL216	Basic Mechanics - Dynamics	AC	4	0	4	CVIL215	6
4	CVIL224	Materials of Construction	AC	3	2	4	-	6
4	CVIL226	Strength of Materials	AC	4	0	4	CVIL215	6
4	HIST100/ TURK100	History of Turkish Republic/ Turkish as a Second Language	UC	2	0	2	-	2
4	GEED-02	General Education Elective-II	UE	3	0	3	-	4
Total Credit						**20**		**29**
YEAR 3								
FALL								
5	MATH309	Numerical Analysis	AC	3	1	3	MATH104 MATH205	6
5	CVIL311	Introduction to Structural Mechanics	AC	4	0	4	CVIL226	6
5	CVIL331	Transportation Engineering	AC	3	2	4	CVIL237	6
5	CVIL341	Soil Mechanics	AC	4	2	5	-	6
5	CVIL351	Fluid Mechanics	AC	4	2	5	MATH104	6
Total Credit						**21**		**30**
SPRING								
6	CVIL312	Structural Analysis	AC	3	0	3	CVIL311	6
6	CVIL314	Reinforced Concrete I	AC	4	0	4	CVIL311	6
6	CVIL316	Steel Structures I	AC	4	0	4	CVIL311	6
6	CVIL344	Foundation Engineering	AC	3	0	3	CVIL341	5
6	CVIL352	Hydromechanics	AC	4	2	5	CVIL351	6
6	CVIL398	Summer Training	FC	0	0	0	-	1
Total Credit						**19**		**30**
YEAR 4								
FALL								
7	CVIL401	Engineering Design I	FC	1	4	3	-	6
7	CVIL415	Reinforced Concrete II	AC	4	0	4	CVIL314	6
7	CVIL417	Steel Structures II	AC	4	0	4	CVIL316	6
7	CVIL461	Construction Planning and Cost Estimating	AC	3	0	3	-	5
7	TE-01	Technical Elective	AE	3	0	3	-	7
Total Credit						**17**		**30**
SPRING								
8	CVIL402	Engineering Design II	FC	0	8	4	CIVL401	8
8	TE-02	Technical Elective	AE	3	0	3	-	7
8	TE-03	Technical Elective	AE	3	0	3	-	7
8	GEED-03	General Education Elective-III	UE	3	0	3	-	4
8	CVIL404	Engineering Attributes and Ethics	FC	2	0	2	-	3
Total Credit						**15**		**29**

AREA ELECTIVE COURSES

	Course Code	Course Name	Credit			ECTS Credits
			Lec.	Pract.	Tot.	
1.	CVIL411	Earthquake Engineering	3	0	3	7
2.	CVIL413	Advanced Structural Analysis	3	0	3	7
3.	CVIL431	Public Transportation	3	0	3	7
4.	CVIL433	Highway Materials	3	0	3	7
5.	CVIL441	Deep Foundation	3	0	3	7
6.	CVIL451	Hydraulic Engineering Design	3	0	3	7
7.	CVIL453	Engineering Hydrology	3	0	3	7
8.	CVIL455	Water Supply and Sewerage	3	0	3	7
9.	CVIL457	Coastal and Harbor Engineering	3	0	3	7
10.	CVIL461	Collaborative Working in Construction	3	0	3	7

COURSE BREAKDOWN

	Total		
	Number	Credit	ECTS Credits
All Courses	45	151	240
University Core Courses	5	14	21
Faculty Core Courses	12	41	67
Area Core Courses	21	78	118
Area Elective Courses	3	9	21
University Elective Courses	3	9	12
Summer Internship	1	0	1

Semester	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Average**
Number of courses	6	6	6	6	5	6	5	5	**5.6**
Total credits	18	21	20	20	21	19	17	15	**18.875**
Total ECTS Credits	29	32	31	29	30	30	30	29	**30**

COURSE DESCRIPTIONS / SYNOPSES

1.	**Course code:** MATH 101	**Course title:** Calculus I
	Functions, Limits and Continuity, Derivatives, Application of the Derivative, Integrals, Applications of Integrals, Techniques of Integration, Infinite Sequences and Series. **Text book:** Thomas' Calculus, 13th Edition, George B. Thomas, Maurice D. Weir, Joel R. Hass, Published by Pearson, 2016.	

2.	**Course code:** PHYS 101	**Course title:** Physics I
	Measurement, Vectors, Motion in 2D and 3D, Force and Motion, Kinetic Energy and Work, Potential Energy, Conservation of Energy, Center of Mass, Rotation, Equilibrium and Elasticity, Gravitation. **Textbook:** Principles of Physics, 10th Edition, Jearl Walker et al. WILEY 2014	

3.	**Course code:** CHEM 101	**Course title:** Chemistry
	Atoms molecules and ions; mass relations in Chemistry; stoichiometry. Gases, the ideal gas law, partial pressures, mole fractions, kinetic theory of gases. Electronic structure and the periodic table. Thermochemistry, calorimetry, enthalpy, The First Law of Thermodynamics. Liquids and Solids. Solutions. Acids and Bases. Organic Chemistry. Basic concepts of engineering. Introduction of courses and meeting with department staff. Visiting the institutions working in the scope of computer engineering.	

4.	**Course code:** ENGL101	**Course title:** English I
	This is a first-semester EAP course for freshman students, and it focuses on developing both receptive and productive skills as well as the study skills required for university-level coursework.	

5.	**Course code:** CVIL101	**Course title:** Introduction to Civil Engineering
	Civil Engineering History. Introduction to Civil Engineering. Program information and Branches of Civil Engineering. Professional fields in which Civil Engineers perform. Professionalism, values, attributes and ethics for Civil Engineers. Academic integrity and ethical issues in academia and research. Engineering Activity: Spaghetti Bridge Competition.	

6.	**Course code:** COMP 103	**Course title:** Information Technology and Applications
	This course aims to introduce all students to the basic concepts of information technology and to train them in the skills needed to use the office productivity tools. The aim is to learn to apply these skills in their freshman year and to be able to continue to use these skills during their undergraduate studies as well as professional lives after graduation.	

7.	**Course code:** MATH 102	**Course title:** Calculus II
	Complex numbers. Vectors in the plane and space. Vector calculus. Line, plane and curves in the space. Limit and continuity in functions with several variables. Partial and directional derivatives. Tangent plane. Maximum and minimum values. Multiple integrals. Cylindrical and spherical coordinate planes. Coordinate transformations. Green Theorem. Surface integrals. Gauss and Stokes theorems. **Textbook:** Calculus, Thomas- Finney, Addison-Wesley, 1998.	

8.	**Course code:** MATH 104	**Course title:** Linear Algebra
	Matrices, determinant. System of a linear equations. Vector spaces. Base and dimension. Linear transformations. Base transformation. Inverse of a linear transformation. Characteristic equations, eigenvalues and eigenvectors and Jordan form. Numerical techniques for calculation of eigenvalues and eigenvectors. Inner product spaces, diagonality, quadratic forms. Norm of a vector space. **Textbook:** Steven, J. Leon, “Linear Algebra with Applications”, Prentice Hall, 1998.	

9.	**Course code:** PHYS 102	**Course title:** Physics II
	Charge, electrical field and Gauss's Law. Basic circuits and Kirchhoff's Laws. Magnetic field. Ampere's Law. Faraday's Laws. Resistance, Magnetic properties of the material. Maxwell equations. Electromagnetic waves and introduction to modern physics. **Textbook:** Physics for Scientist and Engineering, 5th Ed., Serway-Beichner.	

10.	**Course code:** ENGL102	**Course title:** English II
	This course is continuation of ENGL 101- English I. It involves further development of students' EAP oral and written communication skills as well as further development of the study skills essential to success at this level.	

11.	**Course code:** CVIL102	**Course title:** Engineering Drawing
	This course provides an overview of the CAD software used in civil engineering. Students learn the basic skills to originate and edit drawings. Architectural Drawings. Drawing Instruments. Types of lines and line quality.	

12.	**Course code:** COMP 106	**Course title:** Computer Programming
	Review of the C programming language. Structured and modular programming using C. Local and global variables. Structured programming constructs. Arrays and array handling. Multi-dimensional arrays. Structures and Unions. Arrays of structures. Defining new data types in C. Functions in C. Call-by-value and call-by-reference. Character and string functions. Scope and extent. Recursion. Pointers and pointer arithmetic. Dynamic memory allocation and simple data structures in C. Arrays of pointers. Bit manipulation. Files; data and file processing. Conditional compilation and exception handling in C. **Textbook:** Deitel & Deitel, C How to Program, 8th Ed., Prentice Hall, 2016.	

13.	**Course code:** MATH 205	**Course title:** Differential Equations
	Classification of differential equations. Solving methods of first order differential equations. Linear differential equations of higher degrees. Method of undetermined coefficients. Laplace transformation and convolution. Differential equations with several variables. **Textbook:** Elementary Differential Equations and Boundary Value Problems, William E. Boyce – Richard C. Diprima, John-Wiley, 1992.	

14.	**Course code:** MATH 206	**Course title:** Probability and Statistics
	Probability concept and basic theorems. Independency, conditional probability and Bayes' rule. Random variables and functions. Some important discrete and continuous distributions. Distribution of random variable functions. Statistics. Unit, mass, data analysis. Sampling and sampling methods.	

15.	**Course code:** CVIL215	**Course title:** Basic Mechanics-Statics
	Basic Definitions, Concepts and Principles. Statics of Particles. Resultant of forces in space. Equilibrium and free-body concept. Statics of Rigid Bodies. Moments, Couples and Equivalent force systems. Equilibrium of rigid bodies. Distributed forces, Centroids, Center of gravity and Moment of inertia. Definition of Determinacy of structures, analysis of statically determinate structures, trusses, beam, frames and arches.	

16.	**Course code:** CVIL223	**Course title:** Materials of Science
	Fundamentals of materials. Behavior of materials under stress. Particulate composites.	

17.	**Course code:** CVIL237	**Course title:** Geology and Surveying
	Introduction, Distance Measurement. Taping. Linear surveying principles and mapping. Level. Methods and principles of leveling. Applications of leveling. Errors and adjustment. Traverse computations, Tachometry, Coordinates. Equipment. Areas and volumes of irregular shapes.	

18.	**Course code:** ENGL201	**Course title:** English III
	This second year English course helps develop the academic language skills required to write, format, and reference a short professional or technical report, and to present a summary of its contents to a public audience.	

19.	**Course code:** CVIL224	**Course title:** Materials of Construction
	Production, Types, Usages in Construction, Properties and related tests for different materials. Properties of fresh and hardened concrete. Concrete mix design calculations. Bricks, Building Stones, Plasters, Steel, Timber and Polymers.	

20.	**Course code:** CVIL226	**Course title:** Strength of Materials
	Covers the relationship between stress and strain on deformable solids. elastic and elastic-plastic behavior. Internal forces and moments in beams and their diagrams. Stresses in beams. Torsion. Deflection of beams, buckling of columns. Energy Methods.	

21.	**Course code:** MATH 309	**Course title:** Numerical Analysis
	Approximate calculation and error concept. Solution of nonlinear equations. Approximate root finding methods: sequential repeating method, sloping method, Newton-Raphson method, Bairstow method. Numeric integration methods. Finite differences. Numeric derivatives. Euler method, Taylor method. **Textbook:** S. C.Chapra, R. P.Canale Numerical methods for Engineers with Software and Programming applications, 2002	

22.	**Course code:** CVIL216	**Course title:** Basic Mechanics - Dynamics
	Basic fundamentals of particle and rigid body dynamics; energy and momentum methods. Newton's equations of motion.	

23a.	**Course code:** HIST100	**Course title:** History of Turkish Republic
	This course is designed to provide Turkish-speaking students enrolled in English-medium programs with a brief historical account of the Republic of Turkey.	

23b.	**Course code:** TURK100	**Course title:** Turkish as a Second Language
	This course is designed to provide international students with the basic lexis and grammar of the Turkish language and to develop basic receptive and productive skills in Turkish.	

24.	**Course code:** GEED-01 / 02 / 03	**Course title:** General Education Elective-I / II / III
	Courses in the General Education classification will be available for students to take as an elective non-technical course. The topics will be balanced between Humanities, Arts and Social Sciences. Approved courses will be announced at the start of each semester by the Faculty of Engineering. One of the courses must be among Introduction to Economics, Business/Engineering Management/Management or Accounting-I courses.	

25.	**Course code:** CVIL331	**Course title:** Transportation Engineering
	Transportation Modes. Vehicle and Human Characteristics. Vehicle Motion. Sight Distance. Geometric Design. Pavements. Traffic Flow. Highway Capacity.	

26.	**Course code:** CVIL351	**Course title:** Fluid Mechanics
	Understand the definition of a fluid, Understand the concepts of viscosity, surface tension, caterpillar, the difference of Newtonian and non-Newtonian fluids, Understand the assumptions for ideal flow, Understand the difference between laminar and turbulent flow and the transition between them, and know how to determine these flow regimes. Able to calculate hydrostatic pressure on a plate or curved surface and locate the center of pressure. Understand the principles of manometer and know about its applications. Bernoulli Equation. Dimensional analysis. Buckingham PI Theorem.	

27.	**Course code:** CVIL341	**Course title:** Soil Mechanics
	Introduction to physical properties of minerals. Geologic time scale. Rock cycle. Soil compaction. Effective stress concept. Permeability and its measurement. Seepage. One and two dimensional flow condition. Flow nets. Stresses in a soil mass. Consolidation process. Immediate and consolidation settlement. Terzaghi's theory of one-dimensional consolidation. Degree of consolidation. Shear strength of soils. Lateral earth pressure theories. Stability of retaining walls. Slope stability.	

28.	**Course code:** CVIL311	**Course title:** Introduction to Structural Mechanics
	Modeling of structures. Unsymmetrical bending. Shear center. Determinacy, indeterminacy and stability. Virtual work. Deformation and deflected shapes. Force method of analysis. Plastic behavior of structural members.	

29.	**Course code:** CVIL352	**Course title:** Hydromechanics
	Laminar and turbulent flows. Friction factor in pipe flow. Computation of flow in single pipes: Hydraulic machinery: turbines and pumps. Pipeline systems and networks. General characteristics and classification of open channel flow: pressure and velocity distribution. Continuity equation. Energy concept. Momentum principle. Uniform flow. Rapidly varied flow gradually-varied flow. Design of nonerodible and erodible channels.	

30.	**Course code:** CVIL344	**Course title:** Foundation Engineering
	Introduction: Geotechnical properties of soils. Stress Distribution in Soils, Site Investigation, Settlement of Structures, Bearing Capacity of Soils, Design of Shallow Foundations, Retaining Structures - Excavations, Pile Foundations and types of piles, Geotechnical Earthquake Engineering.	

31.	**Course code:** CVIL312	**Course title:** Structural Analysis
	Introduction to structural analysis. Work and energy principles and their application in deformation analysis of structures. Analysis of Statically Indeterminate Structures by the Force Method and Displacement-based methods: Slope Deflection, Moment Distribution, Stiffness Method. derivation of element stiffness matrices, assembly procedures. Introduction to computer applications.	

32.	**Course code:** CVIL314	**Course title:** Reinforced Concrete I
	Mechanical behavior of concrete in uniaxial and multiaxial states of stress. Time dependent behavior of concrete. Mechanical behavior of reinforcing steel. Behavior and strength of uniaxially loaded members; confinement. Behavior and strength of members in pure bending. Behavior and strength of members under combined bending and axial load. Behavior and strength of members under combined shear and bending.	

32.	**Course code:** CVIL316	**Course title:** Steel Structures I
	Basic concepts in steel structure design such as design methods, behavior of steel structures, tension and compression members, codes, safety. Beams and beam-columns, connections, serviceability.	

33.	**Course code:** CVIL398	**Course title:** Summer Training
	In partial fulfillment of the graduation requirements, all students must complete 40 work days of summer training after the end of the second and/or (preferably) third year, during summer vacations. The summer training should be carried out in accordance with the rules and regulations set by the Department/Faculty. Registration of summer training is done during the semester immediately following the training.	

34.	**Course code:** TE-01-02-03	**Course title:** Technical Elective
	This is a Technical Elective course which will be selected by students in their senior year and is offered by the department alternatively during the Fall and Spring semesters. Please see the Technical Elective courses list.	

35.	**Course code:** CVIL461	**Course title:** Construction Planning and Cost Estimating
	Economical and juridical basis of construction planning. Methods of planning. Gantt charts, cyclogrammes, networks. (CPM and PERT) Arrow and precedence systems. Resource leveling and time-cost trade-offs. Probabilistic and deterministic networks. Computer applications of construction planning process by using available softwares. Quantity measurement and cost estimating of a building project.	

36.	**Course code:** CVIL415	**Course title:** Reinforce Concrete II
	General RC behavior: Moment-curvature relationship; plastic hinge, redistribution. Behavior and strength of members under combined shear and torsion: Equilibrium torsion, compatibility torsion, punching, capacity design. Repair/Strengthening Principles: Column, beam, slab repair, structural system improvement. Seismic design principles. Serviceability. Detailing. Computer aided design.	

37.	**Course code:** CVIL417	**Course title:** Steel Structures II
	Principles of Plastic Design, Load and Resistance Factor Design, Tapered Columns, Tapered Beams, Torsion, Introduction to Plate Girders , Beam to Column Connections, Roof Trusses, Introduction to Industrial Building design, Light Gage Cold formed members.	

38.	**Course code:** CVIL401	**Course title:** Engineering Design I
	Engineering Design is an important activity that each engineering student must carry out and go through the phases of the design process. Engineering design is expected to be carried out by students within teams under the supervision of an instructor. It is desired that each project be an interdisciplinary capstone design project. The project is spread to one academic year and it involves the courses CVIL401 and CVIL402. CVIL401 includes the initial problem formulation, a technical survey, the detailed problem study, analysis and description, as well as formulation of a methodical way for the initial solution. A detailed preliminary design documentation for the solution of a realistic and reasonably complex computer engineering problem. It is an extended exercise in the professional application of the skills and experience gained in the undergraduate program. Students form teams, and each team chooses a topic proposed by course instructors. Students are expected to present their progress in the form of reports and presentation, both during the semester and at the end of the semester.	

38.	**Course code:** CVIL402	**Course title:** Engineering Design II
	This course is the sequel to CVIL401. It consists of the implementation of a realistic, preferably interdisciplinary, engineering capstone design project emphasizing engineering design principles on an electrical and electronic engineering topic. It is carried out by a team of students under the supervision of an instructor. The team must complete the detailed design and implementation of the preliminary design they started in the CVIL401 course. It is an extended exercise in the professional application of the knowledge, experience and skills gained in the undergraduate program. The team has to complete analysis, design, implementation, testing and documentation of a proto-type or actual engineered product, present it and submit a final report in the technical project report format.	

39.	**Course code:** CVIL404	**Course title:** Engineering Attributes and Ethics
	This is a final year course which aims to provide knowledge and awareness of a number of important engineering issues. The knowledge areas include but are not limited to: professionalism, ethics, project management, sustainable development, risk management, change management, standards, health, environment, hazards, workplace health and security, societal issues as well as contemporary issues reflecting on the applications of the engineering profession. Awareness areas include but are not limited to entrepreneurship, innovation and the legal ramifications of the engineering solutions.	