FINAL INTERNATIONAL UNIVERSITY

FACULTY OF ENGINEERING

CIVIL ENGINEERING Program of Courses

Course categories: UC = University Core; FC = Faculty Core; AC = Area Core; AE = Area Elective; FE = Faculty Elective; UE = University Elective

Semester	Course Code	Course Title	Course Category	Hours			Total Credit	Pre-requisite	ECTS Credit
				Lecture	Tutorial	Lab/Prac.			
1	ENGR101	INFORMATION TECHNOLOGY AND APPLICATIONS	FC	2	0	1	2	-	2
1	ENGR103	COMPUTER PROGRAMMING-I	FC	2	0	2	3	-	5
1	CHEM121	CHEMISTRY	FC	2	2	1	3	-	5
1	MATH121	CALCULUS-I	FC	3	2	0	4	-	6
1	PHYS121	PHYSICS-I	FC	3	1	1	4	-	5
1	ENGL121	ENGLISH-I	UC	3	0	0	3	-	4
1	TUOG101/TURK131	TURKISH LANGUAGE-I/TURKISH AS A FOREIGN LANGUAGE-I	UC	2	0	0	2	-	3
		Total 7 courses	**TOTAL:**	**17**	**5**	**5**	**21**		**30**
2	CVLE102	ENGINEERING DRAWING	AC	2	0	2	3	-	5
2	CVLE104	INTRODUCTION TO CIVIL ENGINEERING	AC	1	0	0	1	-	2
2	MATH122	CALCULUS-II	FC	3	2	0	4	MATH121	6
2	MATH124	LINEAR ALGEBRA	FC	3	1	0	3	-	5
2	PHYS122	PHYSICS-II	FC	3	1	1	4	PHYS121	5
2	ENGL122	ENGLISH-II	UC	3	0	0	3	ENGL121	4
2	TUOG102/TURK132	TURKISH LANGUAGE-II/TURKISH AS A FOREIGN LANGUAGE-II	UC	2	0	0	2	- / TURK131	3
		Total 7 courses	**TOTAL:**	**17**	**4**	**3**	**20**		**30**
3	MATH225	DIFFERENTIAL EQUATIONS	FC	4	0	0	4	MATH121, MATH124	5
3	CVLE215	BASIC MECHANICS: STATICS	AC	3	1	0	3	PHYS121	4
3	CVLE223	MATERIAL SCIENCE	AC	3	0	0	3	-	4
3	CVLE237	SURVEYING	AC	2	0	2	3	-	4
3	TARH101/HIST111	ATATURK'S PRINCIPLES AND HISTORY OF TURKISH REFORMS-I	UC	2	0	0	2	-	3
3	CVLEXX1	AREA ELECTIVE	AE	X	X	X	3	-	6
3	UNIEXX1	UNIVERSITY ELECTIVE	UE	X	X	X	3	-	4
		Total 7 courses	**TOTAL:**	**14**	**1**	**2**	**21**		**30**
4	CVLE224	MATERIALS OF CONSTRUCTION	AC	3	0	1	3	-	5
4	CVLE226	STRENGTH OF MATERIALS	AC	3	1	0	3	CVLE215	4
4	OHSA206	OCCUPATIONAL HEALTH AND SAFETY	FC	3	0	0	3	-	3
4	ENGR215	RESEARCH METHODS FOR ENGINEERING AND ARCHITECTURE	FC	2	0	0	2	-	3
4	STAT226	PROBABILITY AND STATISTICS	FC	3	1	0	3	MATH121	6
4	TARH102/HIST112	ATATURK'S PRINCIPLES AND HISTORY OF TURKISH REFORMS-II	UC	2	0	0	2	-	3
4	CVLEXX2	AREA ELECTIVE	AE	X	X	X	3	-	6
		Total 7 courses	**TOTAL:**	**16**	**2**	**1**	**19**		**30**
5	CVLE311	INTRODUCTION TO STRUCTURAL MECHANICS	AC	3	1	0	3	CVLE226	4
5	CVLE341	SOIL MECHANICS	AC	3	0	1	3	-	5
5	CVLE351	FLUID MECHANICS	AC	3	0	1	3	MATH124	5
5	CVLEXX3	AREA ELECTIVE	AE	X	X	X	3	-	6
5	CVLEXX4	AREA ELECTIVE	AE	X	X	X	3	-	6
5	UNIEXX2	UNIVERSITY ELECTIVE	UE	X	X	X	3	-	4
		Total 6 courses	**TOTAL:**	**9**	**1**	**2**	**18**		**30**
6	MATH328	NUMERICAL ANALYSIS	FC	3	1	0	3	MATH124, MATH225	6
6	CVLE312	STRUCTURAL ANALYSIS	AC	3	0	0	3	CVLE311	4
6	CVLE314	REINFORCED CONCRETE-I	AC	3	1	0	3	CVLE311	4
6	CVLE316	STEEL STRUCTURES-I	AC	3	1	0	3	CVLE311	4
6	CVLE344	FOUNDATION ENGINEERING	AC	3	0	0	3	CVLE341	4
6	CVLE352	HYDROMECHANICS	AC	3	0	1	3	CVLE351	4
6	UNIEXX3	UNIVERSITY ELECTIVE	UE	X	X	X	3	-	4
		Total 7 courses	**TOTAL:**	**18**	**3**	**1**	**21**		**30**
7	CVLE403	SUMMER TRAINING	AC	0	0	0	0	-	2
7	ENGR401	ENGINEERING DESIGN-I	FC	1	2	0	2	-	6
7	CVLE415	REINFORCED CONCRETE-II	AC	3	1	0	3	CVLE314	6
7	CVLE417	STEEL STRUCTURES-II	AC	3	1	0	3	CVLE316	6
7	CVLEXX5	AREA ELECTIVE	AE	X	X	X	3	-	6
7	UNIEXX4	UNIVERSITY ELECTIVE	UE	X	X	X	3	-	4
		Total 6 courses	**TOTAL:**	**7**	**4**	**0**	**14**		**30**
8	ENGR402	ENGINEERING DESIGN-II	FC	0	4	2	3	ENGR401	10
8	ENGR404	ENGINEERING ATTRIBUTES AND ETHICS	FC	2	0	0	2	-	3
8	CVLEXX6	AREA ELECTIVE	AE	X	X	X	3	-	6
8	CVLEXX7	AREA ELECTIVE	AE	X	X	X	3	-	6
8	ENGRXX1	FACULTY ELECTIVE	FE	X	X	X	3	-	5
		Total 5 courses	**TOTAL:**	**2**	**4**	**2**	**14**		**30**
			GRAND TOTAL:	**100**	**24**	**16**	**148**		**240**

Area and Faculty Elective Courses

No.	Course Code	Course Title	Course Category	Hours			Total Credit	Pre-requisite	ECTS Credit
				Lecture	Tutorial	Lab/Prac.			
1	CVLE216	BASIC MECHANICS - DYNAMICS	AE	3	0	0	3	-	6
2	CVLE241	EARTH SCIENCE	AE	3	0	0	3	-	6
3	CVLE331	TRANSPORTATION ENGINEERING	AE	3	0	0	3	-	6
4	CVLE361	ENGINEERING ECONOMY	AE	3	0	0	3	-	6
5	CVLE411	EARTHQUAKE ENGINEERING	AE	3	0	0	3	-	6
6	CVLE413	ADVANCED STRUCTURAL ANALYSIS	AE	3	0	0	3	-	6
7	CVLE426	STRENGTH OF MATERIALS-II	AE	3	0	0	3	-	6
8	CVLE431	PUBLIC TRANSPORTATION	AE	3	0	0	3	-	7
9	CVLE433	HIGHWAY MATERIALS	AE	3	0	0	3	-	7
10	CVLE441	DEEP FOUNDATION	AE	3	0	0	3	-	6
11	CVLE451	HYDRAULIC ENGINEERING DESIGN	AE	3	0	0	3	-	7
12	CVLE455	WATER SUPPLY AND SEWERAGE	AE	3	0	0	3	-	7
13	CVLE457	COASTAL AND HARBOR ENGINEERING	AE	3	0	0	3	-	7
14	CVLE461	COLLABORATIVE WORKING IN CONSTRUCTION	AE	3	0	0	3	-	7
15	CVLE462	CONSTRUCTION MANAGEMENT	AE	3	0	0	3	-	6
16	CVLE453	ENGINEERING HYDROLOGY	AE	3	0	0	3	-	6
17	CVLE465	PROJECT MANAGEMENT	AE	3	0	0	3	-	6
18	CVLE471	ENVIRONMENTAL ENGINEERING	AE	3	0	0	3	-	6
19	CVLE473	ENVIRONMENTAL SUSTAINABILITY IN ENGINEERING	AE	3	0	0	3	-	6
20	CVLE463	LIFE CYCLE COST ANALYSIS AND METHODS	AE	3	0	0	3	-	6
21	ENGR104	COMPUTER PROGRAMMING-II	FE	2	0	2	3	-	5
22	MATH123	DISCRETE MATHEMATICS	FE	3	1	0	3	-	5
23	MATH228	ENGINEERING MATHEMATICS	FE	3	1	0	3	-	6
24	ELEE231	CIRCUIT THEORY-I	FE	3	0	2	4	-	6
25	AINE201	FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE	FE	3	0	0	3	-	6

PROGRAM INFORMATION

General Goal of the Program	The Faculty of Civil Engineering has always strived to best meet the bulk of the country's need for civil engineers. Program of Civil Engineering in the Faculty of Engineering, at the undergraduate level, is a four years course program. After going through the fundamental engineering courses in the first year, the students will study the specific civil engineering courses from the second year and by end of third year, they would be qualified to attend the summer training course to experience the fieldwork. Our program has one major in civil engineering to train qualified engineers who have sufficient expertise and skills in all civil engineering activities, including execution, design, consulting, and management.
Program Outputs	1.Problem Analysis: Demonstrate solid grounding in mathematics, science, and engineering fundamentals to define, analyse, and solve complex civil engineering problems.
	2.Environment and Sustainability: Understand the environmental, societal, and economic impacts of engineering solutions and the principles of sustainable development.
	3.Ethics: Demonstrate knowledge of ethical principles, professional codes, and responsibilities in engineering practice, with awareness of global and community implications.
	4.Design Solutions: Design safe, effective, and sustainable civil engineering systems, components, or processes, considering health, environment, and economy.
	5.Investigation: Plan and conduct experiments, field studies, or simulations, analyse data, and draw valid engineering conclusions.
	6.Software and Computational Tools: Apply modern software and computational tools to model, analyse, and evaluate civil engineering projects critically.
	7.Communication: Communicate effectively with engineers and non-engineers using oral, written, and visual methods tailored to different audiences.
	8.Individual and Team Work: Work effectively both independently and as a member or leader of diverse, multidisciplinary teams, demonstrating responsibility and collaboration.
	9.Project Management and Leadership: Apply laws, codes, and professional standards to plan, manage, and lead civil engineering projects safely and efficiently.
	10.Future Studies and Lifelong Learning: Engage in lifelong learning and professional development to adapt to evolving technologies, practices, and global challenges in civil engineering.

STATISTICS			
	Total		
Courses	Number	Credit	ECTS
All Courses	52	148	240
University Core Courses	6	14	20
Faculty Core Courses	16	49	81
Area Core Courses	18	49	76
Area Elective Courses	7	21	42
Faculty Elective Courses	1	3	5
University Elective Courses	4	12	16
Free Elective Courses			
Courses Offered By The Administering Department			
Courses Offered By Other Departments			

PER SEMESTER STATISTICS									
	Semester								
	1	2	3	4	5	6	7	8	Average
Number of Courses Per Semester	7	7	7	7	6	7	6	5	6,50
Number of Credits Per Semester	21	20	21	19	18	21	14	14	18,50
ECTS Credits Per Semester	30	30	30	30	30	30	30	30	30,00

COURSE DESCRIPTIONS

Course Descriptions – I: All Area Core and Faculty/School Core courses offered by the department of the program.

Course Code	Course Title	Credit	ECTS Credit	Course Catego.	Pre-requisite	Teaching Language
CHEM121	CHEMISTRY	(2, 2, 1)3	5	FC	-	English
Course Content	In this course, students will learn types of matter, measurements, properties of substances; atoms and atomic theory, components of the atom, introduction to the periodic table, molecules and ions, formulas of ionic compounds, names of ionic compounds; atomic masses, the mole, mass relations in chemical formulas, mass relations in reactions; measurements on gases, the ideal gas law, gas law calculations, psychometric of gaseous reactions, gas mixtures: Partial pressures and atomic spectra, the hydrogen atom, quantum numbers, atomic orbitals; shape and sizes; electron configurations in atoms, orbital diagrams of atoms; the polarity of molecules; principles of heat flow, measurements of heat flow, calorimetry, enthalpy, thermochemical equations, enthalpies of formation, the first law of thermodynamics, liquids and solids.					
PHYS121	PHYSICS-I	(3, 1, 1)4	5	FC	-	English
Course Content	The aim of the course is to provide the basic information in order to help the students to understand the possible complicated problems in engineering. In this regard, the basic principles and methods of solving the problems in physics are taught. The course provides a basic grounding in elementary physics including mechanics. The basic subjects of the course are: Units and dimensions uniformly accelerated motion in one dimension, Freefall, Vector mathematics, Two-dimensional motion, Newton's laws of motion, Applications of Newton's laws, Free body diagrams, Circular Motion, Work and energy, Conservation of energy, Momentum, impulse, and collisions, Rotational kinematics, Torque, Static equilibrium. For completeness, the students are supposed to do 6 experiments related to the subjects of the course.					
MATH121	CALCULUS-I	(3, 2, 0)4	6	FC	-	English
Course Content	Calculus-I covers differential and integral calculus, with applications in geometry, physics, and engineering. Students will learn to apply calculus concepts to various scientific and engineering applications. Topics include identifying function types, graphing functions, evaluating limits, handling elementary functions (polynomial, trigonometric, logarithmic, exponential, etc.), solving undefined limits, and evaluating derivatives. Derivatives of elementary functions, product, and quotient rules will be covered, along with applications of derivatives. Integration topics include evaluating integrals, defining integrals, and using methods like substitution, integration by parts, and integrating rational functions. The course will also explore the practical applications of integration.					
ENGR101	INFORMATION TECHNONOLGY AND APPLICATIONS	(2, 0, 1)2	2	FC	-	English
Course Content	This course aims to introduce all students to the basic concepts of information technology and to train them in the skills needed to use office productivity tools. Course subjects include; History of Computing, Fundamental Hardware descriptions and functions, Software types and functions, Numbering Systems and Binary, Input, Output and Storage devices, Internet and the World Wide Web, Understanding Networks, Privacy while using Computers, Computer Crimes and Security, Computer Ethics, Cloud Computing fundamentals. The course also covers the usage of Microsoft Word, PowerPoint, and Excel.					
ENGR103	COMPUTER PROGRAMMING-I	(2, 0, 2)3	5	FC	-	English
Course Content	The Computer Programming course introduces students to the concept of programming including designing algorithms and writing pseudo-code to solve engineering-related problems, creating flowcharts to represent the steps of a problem solution, and the basic elements of the Python programming language the implement their solution. The course covers common high-level programming concepts such as Data types, constants and variables, arithmetic and logical operators, decision-making expressions. Fundamental components of Python included in the course are; storing and manipulating input data, design and use of selection structures, repetition structures, various data structures such as lists, dictionaries and sets, functions, and modular design.					
MATH122	CALCULUS-II	(3, 2, 0)4	6	FC	MATH121	English
Course Content	This calculus course covers differential and integral calculus with applications in geometry, physics, and engineering. Topics include sequences and infinite series, convergence tests, absolute and conditional convergence, power series, Taylor and Maclaurin series, and radius of convergence. It also covers parametric equations and polar coordinates, graphing polar equations, area in polar coordinates, arc length, and derivative of polar equations. Vectors and vector-valued functions, dot and cross products, lines, and planes are explored. Additionally, the course covers functions of several variables, domain, limits, partial derivatives, and definite integrals over regions.					

MATH124	**LINEAR ALGEBRA**	(3, 1, 0)3	5	FC	-	English
Course Content	The aim of this course is to introduce the basic operations in linear algebra and applications in engineering problems; matrices, matrix properties, and matrix operations: Addition, scalar multiplication, multiplication, transpose, solution of system of linear equations: Elimination method, Gauss Jordan forms, inverse method to solve linear systems, row reduced echelon forms, Gaussian elimination method, inverse, and determinants: solving linear equations with determinant (Cramer's rule), use one row to evaluate determinant, minor, cofactor, adjoin matrix, identity matrix, square matrix of the matrices. Real vector spaces, vectors and their properties and applications in engineering: Addition, subtractions, dot product, scalar multiplication, cross product, basis, dimensions, and subspaces.					
PHYS122	**PHYSICS-II**	(3, 1, 1)4	5	FC	PHYS121	English
Course Content	This course provides the basic information to help the students to understand the possible complicated problems in engineering. The subjects of the course are mostly Electricity and Magnetism. The basic subjects of the course are Properties of electric charges, Coulomb's law, and Electric field of continuous charge distribution, Gauss's law, and electric flux. Application of Gauss's law to charged insulators, Obtaining the value of the electric field from the electric potential, Electric potential and the potential energy due to point charges, Electric potential due to continuous charge distributions, Electric current, Resistance and Ohm's law, Electromotive force, Resistors in series and in parallel. Kirchhoff's rules.					
MATH225	**DIFFERENTIAL EQUATIONS**	(4, 0, 0)4	5	FC	MATH121, MATH124	English
Course Content	In this course, the ordinary differential equations and their applications will be considered. The course will demonstrate the usefulness of ordinary differential equations for modeling physical and engineering problems. Complementary mathematical approaches for their solution will be presented, including analytical methods. The basic content of the course includes first-order ordinary differential equations and their types of exact, separable, Bernoulli, first order, homogeneous ordinary differential equations, linear independence of the solutions, higher-order ordinary differential equations, and their solutions. The undetermined coefficient methods, the variation of the parameter method, Cauchy-Euler equations. The definition of the Laplace transform and some important applications of the Laplace transform will be included in this lecture.					
CVLE104	**INTRODUCTION TO CIVIL ENGINEERING**	(1, 0, 0)1	2	AC	-	English
Course Content	The course delves into the history of Civil Engineering. Students are introduced to the Civil Engineering and understand its significance in shaping the world's infrastructure. They explore various branches within Civil Engineering, such as Geotechnical Engineering, Construction Technology and Management, Hydraulics Engineering, Materials Engineering, Structural Engineering, and Transportation Engineering. Emphasizing professionalism, values, attributes, and ethics, the course equips aspiring Civil Engineers with the essential traits to excel in their careers. Practical application comes to the forefront with the Engineering Activity, the Spaghetti Bridge Competition, allowing students to apply their knowledge in a creative and challenging project.					
CVLE102	**ENGINEERING DRAWING**	(2, 0, 2)3	5	AC	-	English
Course Content	The Engineering Drawing course covers essential concepts, including Orthographic drawing, Pictorial drawing, Sections, Architectural drawings, and Civil engineering drawings, enabling students to communicate their design ideas effectively. Additionally, students are introduced to industry-leading Computer-aided drawing programs like AutoCAD and Revit Autodesk, equipping them with the necessary skills demanded by modern civil engineering practices. By the end of the course, graduates are empowered to tackle real-world projects with confidence, armed with the knowledge and expertise to thrive in their careers as civil engineers.					
ENGR215	**RESEARCH METHODS**	(2, 0, 0)2	3	FC	-	English
Course Content	The aim of this course is to develop students' knowledge and understanding of the role and conduct of quantitative and qualitative research methods in engineering. The imperative for ethical research practice will be presented. The course equips students with the skills to review and conduct methodologically sound research as a part of their professional work. Students develop the skills to recognize and reflect on the strengths and limitations of different research methodologies, understand the links between theory and practice, critically assess research, and address ethical and practical issues. The course takes a step-by-step approach to the design and implementation of quantitative and qualitative techniques including case study and precedent studies, surveys, interviews, focus groups, participant observation, textual and media analysis.					
STAT226	**PROBABILITY AND STATISTICS**	(3, 1, 0)3	6	FC	MATH121	English
Course Content	The objective of this course is to introduce basic probability and statistics concepts. The focus of this course is on both applications and theory. Topics include: introduction to random variables, simple data analysis and descriptive statistics, frequency distribution, cumulative distribution, sample space, events, counting sample points (basic combinatorics), probability of an event, probability axioms, laws of probability, conditional probability, Bayes' rule, discrete and continuous random variables, probability distributions, cumulative probability distributions, discrete and continuous probability distributions, discrete uniform, Binomial, Geometric, Hypergeometric, Poisson, Continuous uniform, Normal Disributions, Gamma and Exponential distribution, jointly distributed random variables, expectation and covariance of discrete and continuous random variables, random sampling, sampling distributions, distribution of Sample Mean, Central Limit Theorem(CLT).					
MATH328	**NUMERICAL ANALYSIS**	(3, 1, 0)3	6	FE	MATH124, MATH225	English
Course Content	In this course students will learn how to solve mathematical problems numerically, which cannot be solved analytically. The course content will includes following topics: Approximate calculation and error concept, Convergence, stability, error analysis and conditioning. Solving systems of linear equations: The LU and Cholosky factorization, pivoting, error analysis in Gaussian elimination. Matrix eigenvalue problem, power method, orthogonal factorizations and least squares problems. Solutions of nonlinear equations. Bisection, Newton`s, secant and fixed point iteration methods. 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.					

CVLE215	**BASIC MECHANICS-STATICS**	(3, 1, 0)3	4	AC	PHYS121	English
Course Content	Civil engineering is based on mechanics. A branch of mechanics is Statics, which covers principles of forces acting on stationary structures, including equilibrium of particles and rigid bodies (concepts of moment, couple, resultant, Free-body diagram), analysis of trusses, beams, and frames, developing functions of the axial force, shear force, and bending moment, and plotting their diagrams by method of sections and integration, and calculations of the properties of surfaces including centroids and moments of inertia for design and analysis of civil engineering structures.					
CVLE238	**SURVEYING**	(2, 0, 2)3	4	AC	-	English
Course Content	This course introduces students to principles and techniques for measuring and mapping land and structures, such as: calculating errors in the measurements, using autolevel to take field measurements, perform traverse computations, and plot profile of the ground, using theodolite to measure the angels and the sides of a traverse, and drawing contour lines. The course content includes an Introduction, Distance Measurement by taping, Areas and volumes of irregular shapes, Linear surveying principles and mapping, Methods and principles of leveling, Applications of leveling, Errors and adjustments, Traverse computations, Tachometry, and Coordinates.					
CVLE224	**MATERIALS OF CONSTRUCTION**	(3, 0, 1)3	4	AC	-	English
Course Content	This course explores the properties, selection criteria, related tests, and applications of materials used in civil engineering projects. Topics include: Properties of fresh and hardened concrete, Bricks, Building Stones, Plasters, Steel, Timber, Polymers, Lime, Gypsum, Hydraulic cement, Mineral aggregates, Clay products, Ferrous metals, and Bituminous materials, as well as theories and calculation of concrete mix design, principal steps in production, physical and mechanical properties of concrete.					
CVLE226	**STRENGTH OF MATERIALS**	(3, 1, 0)3	5	AC	CVLE215	English
Course Content	This course explores the behavior of solid objects under various stresses and strains, and provides foundational knowledge for designing and analyzing structural components to ensure safety and reliability in engineering applications. Topics include the relationship between stress and strain on deformable solids with emphasis on two-dimensional problems, Internal forces and moments in beams and their diagrams, Stresses in beams due to bending moment, shear force, and torque, Determining stress in a structural member due to a combination of loads, Deflection of beams, and Buckling of columns.					
CVLE351	**FLUID MECHANICS**	(3, 0, 1)3	5	AC	MATH124	English
Course Content	Through this course, the sudents learn the following: the definition of a fluid, the concepts of viscosity, surface tension, caterpillar, the difference of Newtonian and non-Newtonian fluids, the assumptions for ideal flow, the difference between laminar and turbulent flow and the transition between them, and how to determine these flow regimes. The students will aslo learn to calculate hydrostatic pressure on a plane or curved surface and locate the center of pressure, and will learn the principles of the manometer, the Bernoulli Equation, Dimensional analysis, and Buckingham PI Theorem.					
CVLE341	**SOIL MECHANICS**	(3, 0, 1)3	5	AC	-	English
Course Content	This course examines the properties and behavior of soil as an engineering material. It familiarizes students with geotechnical terminology and concepts commonly encountered in engineering practice. The contents of this course are Introduction to physical properties of minerals, Rock cycle, Soil compaction, Effective stress concept, Permeability and its measurement, Seepage, One and two-dimensional flow conditions, Flow nets, Stresses in a soil mass, 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, and Slope stability.					
CVLE311	**INTRODUCTION TO STRUCTURAL MECHANICS**	(3, 1, 0)3	4	AC	CVLE226	English
Course Content	This is an elementary course on Structural Analysis through which various methods in determining response of structures when subjected to external agitation will be discussed. Topics of this course include Analysis of statically determinate structures (beams, trusses, frames, etc,), Shear and moment diagrams, Influence lines, Moving loads, Methods to compute deflections include double integration, moment area, and virtual work. The objective of this course is to teach students how to analyze various statically indeterminate systems, and helps them to build the foundation for more advanced courses related to structural engineering.					
CVLE352	**HYDROMECHANICS**	(3, 0, 1)3	4	AC	CVLE351	English
Course Content	This course focuses on the behavior of fluids, particularly water, and their interactions with structures; It equips students with the skills to design and analyze water-related infrastructure like dams, pipelines, and drainage systems, integrating theoretical knowledge with real-world applications. Topics include Laminar and turbulent flows, Friction factor in pipe flow, Computation of flow in single pipes, Hydraulic machinery (turbines and pumps), Pipeline systems and networks, Open channel flow , Continuity equation, Energy concept, Momentum principle, Uniform flow, Rapidly varied flow gradually-varied flow, Design of channels, and Analyzing uniform flow in closed conduits.					
CVLE344	**FOUNDATION ENGINEERING**	(3, 0, 0)3	4	AC	CVLE341	English
Course Content	ThIis course discusses the principles of structures' foundation design. Some theoretical background information is also given in addition to the fundamental concepts explained in the course CVLE341 Soil Mechanics. The topics of the course are Geotechnical properties of soils, Site Investigation and testing methods, Settlement of Structures, Bearing Capacity of Soils, Design of Shallow Foundations, Retaining Structures, Pile Foundations, and and Soil improvement techniques. This course equips students with the knowledge necessary to ensure the stability and safety of structures by addressing the challenges of soil-structure interaction.					

CVLE312	**STRUCTURAL ANALYSIS**	(3, 1, 0)3	4	AC	CVLE311	English
Course Content	This course familiarizes students with the behavior of structures under various loads, emphasizing the work and energy principles and their application in the deformation analysis of structures. The objective of this course is to teach students how to analyze various statically indeterminate systems. Topics of the course include Analysis of Statically Indeterminate Structures by the Force Method and Displacement-based methods (e.g., Slope Deflection, Moment Distribution, Stiffness Method), Derivation of element stiffness matrices, Introduction to computer applications. This course enables students to represent real structures by idealized structures.					
CVLE314	**REINFORCED CONCRETE I**	(3, 1, 0)3	4	AC	CVLE311	English
Course Content	This course focuses on the material behavior of concrete and steel under uniaxial and multiaxial states of stress. It explains how the concept of structural safety is employed for the design of reinforced concrete members such as beams, slabs, columns, and footings, considering factors like bending, shear, and axial forces. Students learn about load distribution, serviceability, durability, and detailing of reinforcement. The topics of the course include the designing process of reinforced concrete members for pure bending, combined bending and axial load, and shear.					
CVLE316	**STEEL STRUCTURES I**	(3, 1, 0)3	4	AC	CVLE311	English
Course Content	Through this course, students will explore the fundamental principles of designing and analyzing steel structures in civil engineering. They will gain a comprehensive understanding of the behavior and properties of steel as a construction material. The course covers essential topics such as load distribution, stability, and structural design codes and standards, the analysis and design of tensile members, compressive members, beams, beam-columns, and connections. Through theoretical lectures and practical assignments, students will learn to create efficient and safe steel structures, considering factors like load-bearing capacity, material properties, and construction constraints.					
ENGR401	**ENGINEERING DESIGN-I**	(1, 2, 0)2	6	FC	-	English
Course Content	In this Engineering Design course, students undertake an interdisciplinary capstone project under instructor supervision. The project spans one academic year, encompassing CVLE401 and CVLE402 courses. CVLE401 involves problem formulation, technical surveys, detailed problem study, analysis, and methodical initial solution. Students collaborate in teams, selecting topics proposed by instructors, to create detailed preliminary design documentation for a realistic and complex computer engineering problem. Throughout the semester, students present progress through reports and presentations, culminating in an end-of-semester showcase. This course enables students to apply their skills and experiences gained in the undergraduate program, honing their professional engineering abilities.					
ENGR403	**SUMMER TRAINING**	(0, 0, 0)0	2	FC	-	English
Course Content	Through this 30-day internship students apply their theoretical knowledge in a real professional setting. It takes place after the third year of their Bachelor's studies and can be undertaken in any institution related to Civil Engineering subdisciplines. This practical experience exposes students to real-life tasks, helping them align with industry needs and identify their professional interests. At the end of the training, students write a report summarizing their internship experience, which is then evaluated by a committee. This valuable training period equips students with practical skills and insights, preparing them for a successful career in the field of Civil Engineering.					
ENGR402	**ENGINEERING DESIGN-II**	(0, 4, 2)3	10	FC	ENGR401	English
Course Content	This course is the sequel to ENGR401, consisted of the implementation of a realistic, preferably interdisciplinary, engineering capstone design project emphasizing engineering design principles on civil engineering topics. It is a teamwork project supervised by an instructor. The team must complete the detailed design and implementation of the preliminary design they started in the ENGR401 course. 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.					
ENGR404	**ENGINEERING ATTRIBUTES AND ETHICS**	(2, 0, 0)2	3	FC	-	English
Course Content	Engineering Attributes and Ethics 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.					
CVLE415	**REINFORCED CONCRETE II**	(3, 1, 0)3	6	AC	CVLE314	English
Course Content	In line with the objectives outlined for Reinforced Concrete 1, this course delves into the design process for additional reinforced concrete structural members. Topics include load transfer mechanisms in one-way slabs, designing one-way slabs for flexure, shear, temperature, and shrinkage requirements, and design of short columns. The course also emphasizes the importance of development length in reinforced concrete member behavior, calculations for development length, bar splices, and bar cutoffs, as well as explaining cracking behavior and calculating deflections in reinforced concrete members.					
CVLE417	**STEEL STRUCTURES II**	(3, 1, 0)3	6	AC	CVLE316	English
Course Content	In line with the objectives outlined for Steel Structure 1 and as a continuation of that course, this course discusses the behavior and design of tensile and compressive members, laterally restrained and unrestrained beams, beam-columns, connections, and built-up sections according to the limit states design concept. It also addresses the identification of buckling in various steel elements, the definition of compact and non-compact sections, and the characteristics of cold-formed sections. Upon completing this course, students are expected to have a fundamental understanding of the design and failure modes of steel structural members.					

Course Descriptions – III: All Area Elective and Faculty/School Elective courses offered by the department of the program.						
Course Code	**Course Title**	**Credit**	**ECTS Credit**	**Course Catego.**	**Pre-requisite**	**Teaching Language**
CVLE223	**MATERIALS OF SCIENCE**	(3, 0, 0)3	6	AE	-	English
Course Content	This course discusses principles necessary for understanding the fundamental nature and properties of engineering materials and to clarify the significance of these principles in engineering practice. The course topics include engineering requirements of materials, the structure of matter, atomic arrangements, structural imperfections, and atom movements. Additionally, the course covers mechanical properties such as force, stress, deformation, and strain, along with elasticity, elastic and plastic behavior, viscosity, and rheological models. It also addresses creep, relaxation, brittleness, ductility, hardness, fatigue, toughness, resilience, and damping characteristics of materials.					
CVLE216	**BASIC MECHANICS - DYNAMICS**	(3, 0, 0)3	6	AE	-	English
Course Content	This course focuses on the principles of motion and the forces affecting motion.The course covers kinematics and kinetics of particles and rigid bodies, Newton's laws of motion, work-energy principles, impulse-momentum methods, and vibrations. Topics include linear and angular motion, relative motion, and the application of dynamic principles to engineering problems. This course equips students with the foundational knowledge and analytical skills necessary to understand and solve dynamic problems in engineering, laying the groundwork for more advanced studies and applications in civil engineering.					
CVLE241	**EARTH SCIENCE**	(3, 0, 0)3	6	AE	-	English
Course Content	This course explores the Earth's physical processes and materials, emphasizing their relevance to engineering. It covers geology, mineralogy, and geomorphology, focusing on rock and soil formation, structure, and properties. Topics include Evaluating the risk associated with near-earth objects , Predicting the locations of earthquakes, trenches, mountains, and volcanoes for tectonic maps not previously analyzed, Predicting directions of plate motion, Estimating the age of the seafloor and draw lithospheric cross-sections for tectonic maps, Rock forming processes and/or the type of rocks associated with various plate tectonic settings.					
CVLE331	**TRANSPORTATION ENGINEERING**	(3, 0, 0)3	6	AE	-	English
Course Content	This course equips students with the knowledge and skills to develop efficient, safe, and sustainable transportation systems, preparing them for advanced studies and careers in transportation infrastructure and management. The course covers topics such as Introduction to the development of transportation systems, (air, rail, water, and land), Vehicle and Human Characteristics, Vehicle Motion, Sight Distance, Geometric Design (horizontal curves, vertical curves, spiral transitions), Pavement design, Traffic Flow, Highway Capacity, Traffic analysis at intersections, Traffic signal design, Basic definitions and computations of the level of service.					
CVLE361	**ENGINEERING ECONOMY**	(3, 0, 0)3	6	AE	-	English
Course Content	This course introduces the principles of economic analysis for engineering projects. The course covers cost estimation, cash flow analysis, time value of money, and economic decision-making. Topics include present worth, annual worth, rate of return, benefit-cost analysis, depreciation, and break-even analysis. Students learn to evaluate the economic feasibility of projects, considering factors like risk and uncertainty. This course equips students with the skills to make informed economic decisions in engineering, ensuring efficient allocation of resources and cost-effective project management.					
CVLE411	**EARTHQUAKE ENGINEERING**	(3, 0, 0)3	6	AE	-	English
Course Content	This is an advanced design course that discusses the methods and philosophy of seismic design in the context of the Eurocodes. It is an extension and integration of earlier design courses and necessarily relies on the students' background in Structural Dynamics. Topics include Fundamentals of structural dynamics and earthquake engineering, Free and forced vibration response of single-degree-of-freedom systems, continuous systems, and multi-degree-of-freedom systems, Modal analysis techniques for multi-degree-of-freedom systems, Earthquake mechanisms, attenuation relationships, response spectrum, and local site effects, Earthquake protective systems (base isolators and dampers).					
CVLE413	**ADVANCED STRUCTURAL ANALYSIS**	(3, 0, 0)3	6	AE	-	English
Course Content	This course mainly deals with matrix analysis of structures. It begins with a review of the basic concepts of structural analysis and matrix algebra and shows how the latter provides an excellent mathematical framework for the former. This is followed by demonstrations through many examples, of how matrix methods can be applied to linear static analysis of skeletal structures (plane and space trusses; beams and grids; plane and space frames) by the stiffness method and the flexibility method. Also, it explains the reduced stiffness formulation and the analysis of elastic instability.					
CVLE426	**STRENGTH OF MATERIALS-II**	(3, 0, 0)3	6	AE	-	English
Course Content	This course is an advanced course that builds on the principles learned in Strength of Materials-I. The course covers complex stress and strain analysis, theories of failure, and advanced topics in bending, torsion, and axial loads. Topics include stress transformation, Mohr's circle, shear center, unsymmetrical bending, beam-columns, and energy methods. Students also learn about inelastic behavior and stability of structures. This course equips students with advanced analytical skills required for designing and analyzing complex structural elements, preparing them for professional practice and further studies in structural engineering.					
CVLE431	**PUBLIC TRANSPORTATION**	(3, 0, 0)3	7	AE	-	English
Course Content	This course focuses on the planning, design, operation, and management of public transit systems. The course covers modes of public transportation such as buses, trains, subways, and light rail. Topics include transit system planning, demand forecasting, route and schedule design, capacity analysis, and performance evaluation. Students learn about the integration of public transit with urban development, sustainability considerations, and the socio-economic impacts of transit systems.This course equips students with the knowledge and skills to design and manage efficient, accessible, and sustainable public transportation systems.					

CVLE433	**HIGHWAY MATERIALS**	(3, 0, 0)3	7	AE	-	English
Course Content	This course is about the selection, testing, and performance evaluation of materials used in highway construction. The course covers properties and applications of asphalt, concrete, aggregates, and other pavement materials. Topics include material specifications, mix design, compaction, durability, and quality control. Students learn about laboratory and field testing methods, material behavior under different loading conditions, and the impact of environmental factors. This course equips students with the knowledge and skills to select and evaluate materials for highway projects, ensuring safe, durable, and cost-effective road construction.					
CVLE441	**DEEP FOUNDATION**	(3, 0, 0)3	6	AE	-	English
Course Content	This course focuses on the design, analysis, and construction of deep foundation systems. The course covers different types of deep foundations such as piles, drilled shafts, and caissons. Topics include soil-structure interaction, load transfer mechanisms, pile driving and installation techniques, Cast in-situ piles, sheet piles, diaphragm walls, anchored, strutted wall, and soil nailing and anchors in excavations. Students will learn about load testing methods, settlement analysis, and design principles for various soil conditions.					
CVLE451	**HYDRAULIC ENGINEERING DESIGN**	(3, 0, 0)3	6	AE	-	English
Course Content	This course discusses the principles and applications of fluid mechanics to the design of hydraulic systems. The course covers the design of pipes, pumps, open channels, culverts, and hydraulic structures like dams and spillways. Topics include flow analysis, pressure distribution, energy and momentum principles, and sediment transport. Students learn computational methods, design criteria, and safety considerations. This course equips students with the skills to design efficient and safe hydraulic systems for various civil engineering applications.					
CVLE455	**WATER SUPPLY AND SEWERAGE**	(3, 0, 0)3	6	AE	-	English
Course Content	The focus of this course is on the design and management of water supply and wastewater systems. The course covers water sources, treatment processes, distribution systems, and sewer design. Topics include hydraulic calculations, pump and pipe design, water quality management, and sanitation principles. Students learn about system planning, environmental regulations, and sustainability considerations. This course equips students with the skills to design, analyze, and manage effective water and sewerage systems for safe and efficient public health.					
CVLE457	**COASTAL AND HARBOR ENGINEERING**	(3, 0, 0)3	6	AE	-	English
Course Content	This course is about the design and management of coastal and port structures. The course covers coastal processes, erosion control, harbor design, and the construction of sea walls, breakwaters, and docks. Topics include wave dynamics, sediment transport, coastal protection, and marine infrastructure. Students learn about environmental impacts, regulatory considerations, and safety measures. This course equips students with the knowledge to design and maintain resilient and efficient coastal and harbor systems.					
CVLE461	**COLLABORATIVE WORKING IN CONSTRUCTION**	(3, 0, 0)3	6	AE	-	English
Course Content	Collaborative Working in Construction in civil engineering focuses on effective teamwork and communication in construction projects. The course covers collaboration strategies, project management, conflict resolution, and stakeholder engagement. Topics include team dynamics, interdisciplinary coordination, and the use of collaborative technologies and tools. Students learn about project delivery methods, communication protocols, and the role of leadership in fostering a collaborative environment. Practical exercises, case studies, and group projects provide hands-on experience. This course equips students with skills to work efficiently and harmoniously in multidisciplinary construction teams, enhancing project outcomes and performance.					
CVLE462	**CONSTRUCTION MANAGEMENT**	(3, 0, 0)3	6	AE	-	English
Course Content	This course focuses on the planning, coordination, and control of construction projects from inception to completion. Topics include project scheduling, cost estimation, quality control, safety management, contract administration, and risk management. Students learn about project delivery systems, construction equipment, and labor management. This course equips students with the skills to efficiently manage construction projects, ensuring they are completed on time, within budget, and to the required quality standards, preparing them for leadership roles in the construction industry.					
CVLE463	**LIFE CYCLE COST ANALYSIS AND METHODS**	(3, 0, 0)3	6	AE	-	English
Course Content	This course focuses on evaluating the total cost of owning, operating, maintaining, and disposing of infrastructure projects over their life cycle. The course covers Application of cost engineering for construction projects, bidding procedures, Overview of construction cost estimating process methods, Project monitoring and cost controlling, discounting, sensitivity analysis, and decision-making criteria. Students learn to assess economic, environmental, and social impacts of projects. This course equips students with the skills to make informed decisions that optimize life cycle performance and cost-effectiveness of civil engineering projects.					
CVLE453	**ENGINEERING HYDROLOGY**	(3, 0, 0)3	6	AE	-	English
Course Content	This course focuses on the study of water quantity and its distribution in natural systems. It is designed to acquaint students with precipitation, evapotranspiration, infiltration, runoff, and streamflow analysis, developing hydrographs, frequency analysis of rainfall and streamflow data, flood routing, reservoir capacity determination and sedimentation, and statistical analysis of hydrological parameters and generation of random numbers. The course content includes Flood Routing, Reservoir Routing, Channel Routing, Frequency analysis of rainfall, low flow, floods, and droughts, Reservoir capacity and sedimentation, Basic concepts of stochastic hydrology.					

CVLE465	**PROJECT MANAGEMENT**	(3, 0, 0)3	6	AE	-	English
Course Content	This course focuses on principles and techniques for planning, organizing, and controlling projects. The course covers project initiation, scope management, scheduling, budgeting, risk assessment, and stakeholder communication. Topics include Introduction to management (description of the construction industry, contract systems and its types), Review of typical organizational structures for construction companies and projects, Planning and scheduling, Survey of main activities and procedures for starting a new project, Communication basics, Monitoring and control systems, Procedures and formalities for project completion, Introduction to building information modeling (BIM).					
CVLE471	**ENVIRONMENTAL ENGINEERING**	(3, 0, 0)3	6	AE	-	English
Course Content	This course presents a broad introduction to Environmental Engineering where the fundamental principles that serve as the foundation for the entire field of environmental engineers will be overviewed. These principles are based on chemistry, biology, physics, and mathematics and are applied to such cases as water quality engineering, air quality engineering, and hazardous waste management. The assessment of the environmental impacts of human activities and projects will be explained and will be practiced by students for a specific problem definition.					
CVLE473	**ENVIRONMENTAL SUSTAINABILITY IN ENGINEERING**	(3, 0, 0)3	6	AE	-	English
Course Content	The course draws the concepts from agriculture, economics, chemistry, biochemistry, and microbiology in sustainable design, product, and process developments. Students are expected to understand the impact of conventional engineering practice/designs on the greater contexts that lead to unsustainability. The course content includes an Overview of sustainability concepts; indicators of sustainability; applications of sustainability concepts to various engineering disciplines; green engineering; life cycle analysis; use of mass and energy balances in the design of sustainable systems; selected case studies.					