Kurdistan Regional Government- Iraq
Ministry of Higher Education and
Scientific Research
Soran University

Undergraduate Degree Program Catalogue

(2025-2026)

BSc in Civil and Environmental Engineering Department

Departmental Vision

To be a leading civil and environmental engineering department in the Kurdistan Region, producing ethical, innovative, and lifelong-learning engineers who advance resilient infrastructure, environmental sustainability, and community well-being.

Departmental Mission

The Department of Civil and Environmental Engineering educates students in the technical, environmental, social, and ethical dimensions of engineering. It prepares graduates to solve complex regional and global problems, design and manage safe and sustainable infrastructure, use modern engineering tools, pursue professional growth, and serve Soran, the Kurdistan Region, and the wider community through education, research, innovation, and professional service.

Department Overview

Since 2013, Soran University has had a Department of Civil Engineering inside the Faculty of Engineering. Department of Civil and Environmental Engineering's (DCVEE) undergraduate program prepares students towards a civil engineering degree. Bridges, dams, roads, transit systems, airports, tunnels, irrigation systems, water supplies, and industrial and commercial structures are just a few of the infrastructure that civil engineers plan, design, build, and manage in today's cities. It is one of the most satisfying jobs available to men and women in terms of personal fulfilment, long-term contribution to humanity, and financial rewards.

Civil engineering deals with the planning, design, and building of infrastructure that are necessary in modern society. Civil engineers deal with issues such as constructions, water supply, traffic congestion, pollution, and infrastructure upgrades. Structural engineering, construction engineering, geotechnical engineering, transportation engineering, environmental engineering, and water resources engineering are all sub-disciplines of civil engineering.

DCVEE is dedicated to directly improving the community life of the Kurdistan Region, specifically the city of Soran, by providing quality education and skilled graduates, applied research conducted by staff and students, seminars and workshops presented in collaboration with city government departments, and field engineers who have graduated from the department.

The department's undergraduate programs include pure and applied mathematics courses, as well as updated elective disciplines that the industry and market want.

Program Educational Objectives (PEOs):

Here are our four updated PEOs, which were revised by the Scientific Committee during its April meeting:
• PEO 1: Technical Mastery and Problem-Solving Graduates apply a robust foundation in mathematics, science, and multi-disciplinary civil engineering to solve complex technical challenges. They utilize critical thinking and modern engineering tools to design and manage resilient infrastructure that meets the evolving demands of both global and local markets.
• PEO 2: Environmental Responsibility and Sustainability Graduates integrate environmental principles into the life cycle of constructed systems. In alignment with the department's mission, they responsibly address the impact of engineering on the community and the physical world, prioritizing sustainable practices and the preservation of natural resources within the Kurdistan Region.
• PEO 3: Leadership, Ethics, and Career Advancement Graduates exhibit professional leadership and effective communication within industry, government, or academia. They uphold the highest ethical standards and achieve professional licensure, contributing to the advancement of civil engineering systems while maintaining the integrity vital to the quality of life.
• PEO 4: Professional Growth and Lifelong Learning Graduates pursue continuous professional development through advanced research, specialized certifications, and the acquisition of new methodologies. They remain adaptable to technological shifts, ensuring their skills and policies stay relevant to the society they serve.

Program Learning Objectives

- Our graduates will meet Critical thinking and problem solving based on a fundamental knowledge of mathematics, science, engineering science and a broad range of civil engineering technical areas.

- Our graduates will be prepared for Leadership and effective communication to establish a Civil Engineering career in industry, government, or academia and achieve professional licensure as appropriate

Program Learning Outcomes

Below are seven proposed Program Learning Outcomes (PLOs) for the Civil and Environmental Engineering Department, aligned with the four PEOs and adapted to the potentials and challenges of Soran City and the Kurdistan Region. Upon graduation, students should be able to:

PLO	Program Learning Outcome
PLO 1: Engineering Knowledge and Problem Analysis	Apply mathematics, natural sciences, engineering fundamentals, and specialized civil and environmental engineering knowledge to identify, formulate, and solve complex engineering problems relevant to the Kurdistan Region.
PLO 2: Engineering Design for Resilient Infrastructure	Design civil and environmental engineering systems that satisfy specified needs while considering public health, safety, cultural context, economic constraints, environmental protection, climate resilience, and local conditions in Soran and the Kurdistan Region.
PLO 3: Investigation, Data Analysis, and Modern Tools	Conduct investigations using appropriate fieldwork, laboratory testing, surveying, geospatial technologies, digital modeling, data analysis, and modern engineering tools to evaluate civil and environmental engineering problems.

PLO	Program Learning Outcome
PLO 4: Sustainability, Environment, and Resource Management	Evaluate and develop sustainable engineering solutions that address water scarcity, wastewater treatment, solid waste, air and soil pollution, energy efficiency, natural-resource conservation, and the protection of ecosystems.
PLO 5: Risk, Disaster, and Climate Resilience	Assess and manage risks associated with earthquakes, landslides, flash floods, erosion, climate change, infrastructure failure, and rapid urbanization, and develop measures that improve the resilience of communities and infrastructure.
PLO 6: Communication, Teamwork, Leadership, and Professional Ethics	Communicate effectively with technical and non-technical audiences, function productively in multidisciplinary and multicultural teams, demonstrate leadership, and apply ethical, legal, and professional principles in engineering practice.
PLO 7: Professional Development, Innovation, and Lifelong Learning	Demonstrate the ability to pursue lifelong learning, undertake independent research, adopt emerging technologies and methodologies, and develop innovative solutions that support the social and economic development of Soran and the Kurdistan Region.

PLO–PEO Alignment Matrix

	PEO 1	PEO 2	PEO 3	PEO 4
PLO 1: Engineering Knowledge and Problem Analysis	**P**	**S**	**-**	**S**
PLO 2: Engineering Design for Resilient Infrastructure	**P**	**P**	**S**	**S**
PLO 3: Investigation, Data Analysis, and Modern Tools	**P**	**S**	**-**	**P**
PLO 4: Sustainability, Environment, and Resource Management	**S**	**P**	**S**	**S**
PLO 5: Risk, Disaster, and Climate Resilience	**P**	**P**	**S**	**S**
PLO 6: Communication, Teamwork, Leadership, and Professional Ethics	**S**	**S**	**P**	**S**
PLO 7: Professional Development, Innovation, and Lifelong Learning	**S**	**S**	**S**	**P**

Legend:
P = Primary alignment

S = Supporting alignment

Graduation Requirements

Summary of Courses Required for Graduation	
Course Group	**Number of ECTS**
National Requirements	12
University Requirements	59
Core Modules	152
Elective Modules	17
Total	**240**

Curriculum Requirements

A. National Requirements

Kurology and English are the national requirements courses for all region Universities, with 12 ECTS, as 6 ECTS each.

B. Mathematics and Basic Sciences

Mathematics and basic science courses must be taken for a minimum of 48 ECTS. These courses must have a minimum of 30 ECTS of mathematics, beginning with the first calculus course, along with 6 ECTS of General physics, 6 ECTS of chemistry for civil engineers, and 6 ECTS information technology.

Following are examples of how the mathematics and the fundamental sciences requirements are satisfied:

MATH: Calculus, Engineering Mathematics, Partial Differential Equations, Probability and Statistics and Engineering Analysis 30

PHYCHEM: General Physics 6

CHEM: Chemistry for Civil Engineers 6

IT: Information Technology 6

C. General Sciences

A civil engineer requires a degree that will not only provide them technical competence but also improve their understanding of various social values and their capacity to communicate difficult technical ideas to laypeople. The ECTS requirements for these sciences are 31. The requirement is met as follows:

Fun Chemical Eng: Introduction to Civil Engineering	6
Envt: Introduction to Environmental Engineering & Science	7
ENGL COM: Critical Reading and Writing, and Academic debate	12
ENG ECON: Construction Management and Economics	6

D. BASIC ENGINEERING SCIENCES AND FUNDAMENTAL OF DESIGN

Basic Engineering Sciences and Civil Engineering Sciences & Introduction to Design are the two sub-areas that make up the Engineering Sciences area as the following:

1. Basic Engineering Sciences (37 ECTS)

Code	Module	ECTS
SOU20114	Civil Engineering Graphics (CAD Drawing)	6
SOU20121	Statics	6
SOU20124	Dynamics	5
SOU20131	Strength of Materials	7
SOU20032	Fluid Mechanics	6
SOU20133	Building Materials Science	7

Basic Engineering Sciences Elective (6 ECTS)

Code		Module	ECTS
		Materials for the Built Environment (Recommended)	6
	Or	Science of Materials	6
		Concepts of Environmental Chemistry	6
	Or	Biological Principles of Environmental Engineering	6

2. Civil Engineering Sciences and Introduction to Design

The requirements for many of these courses include the engineering analysis and design courses. In this sub-area, the general Civil Engineering concentration requires 53 ECTS, the necessary courses are:

Code	Module	ECTS
SOU20311	Geomatics	8
SOU20140	Engineering Hydrology	5
SOU20141	Construction Materials	6
SOU20142	Structural Analysis - Determinate	6
SOU20143	Geology and Geotechnical Engineering	6

SOU20150	Reinforced Concrete	7
SOU20153	Transportation and Urban Planning	7
SOU20154	Soil Mechanics	8

E. ENGINEERING ANALYSIS AND DESIGN

Senior design courses must be taken for a minimum of 47 ECTS in the general civil concentration. The necessary classes are:

Structural Engineering Design – 12 ECTS

Code	Module	ECTS
SOU20160	Design of Reinforced Concrete Structures	6
SOU20171	Design of Steel Structures	6

Water Resources and Environmental Design – 6 ECTS

Code		Module	ECTS
SOU20164		Water Resources Engineering Design	6
SOU20165	Or	Municipal Water Supply and Waste Management	6

Construction Management – 6 ECTS

Code	Module	ECTS
SOU20170	Construction Management and Economics	6

Transportation – 6 ECTS

Code	Module	ECTS
SOU20162	Highway Engineering	6

Geotechnical – 6 ECTS

Code	Module	ECTS
SOU20161	Foundation Engineering	6

Elective courses – 11 ECTS

Code	Module	ECTS
SOU20173	Sustainability in Civil Engineering	6
SOU20174	Creativity and Innovation	6
SOU20175	Traffic Engineering	5
SOU20176	Earthquake Engineering	5
	Bio-engineering	6
	Life Cycle Assessment of Materials, Products, and Infrastructure	6
	Climate Hazards and Resilient Cities	6

Program Curriculum Synopsis (Module Content)

COURSE CODE : SOU20001
COURSE : General English
NO. OF ECTS : 6
PRE-REQUISITE : None

This course provides an introduction to technical terms in English language. The course also aims at enhancing the students' ability to listen, speak, read, and write in English language more confidently and with ease.

COURSE CODE : SOU20002
COURSE : Calculus
NO. OF ECTS : 6
PRE-REQUISITE : None

This module uses mathematical methods in a form suitable for the solution of engineering problems. Students learn and apply functions in one-variable and their derivatives to model, analyse and solving problems. After this course they will be familiar with modeling engineering problems as functions of one-variable, optimize a problem using differential and using vectors and trigonometry in order to solve engineering problems.

COURSE CODE : SOU20003
COURSE : Kurdology
NO. OF ECTS : 6
PRE-REQUISITE : None

This course focuses on introducing students to Kurdish history, culture, folklore, Kurdish language, topography of Kurdistan regions.

COURSE CODE : SOU20004
COURSE : Information Technology
NO. OF ECTS : 6
PRE-REQUISITE : None

This course is designed to familiarize students with computers and their applications. It will also emphasize the use of computers and technology throughout their college, and future careers. Students will learn fundamental concepts of computer hardware and software and become familiar with a variety of computer applications, including word-processing, spread sheets, databases, and multimedia presentations. Students will also investigate Internet-based applications, working with email and learning how to browse

the web. Coursework also includes activities that explore social and ethical issues related to computers.

COURSE CODE : SOU20105
COURSE : Introduction to Civil Engineering
NO. OF ECTS : 6
PRE-REQUISITE : None

This course gives the students an idea about the courses they would be required to take to pursue a degree in Civil Engineering and provide a comprehensive overview of the component fields within civil engineering. The course also Introduce students to the global implications of Civil Engineering practice and to state of the art technologies that are used in Civil Engineering practice. This course will provide students with an introduction into teambuilding and the requirements for team participation and also explain about the career opportunities for Civil Engineers.

COURSE CODE : SOU20010
COURSE : Engineering Mathematics
NO. OF ECTS : 6
PRE-REQUISITE : None

In this module students learn integral calculus and its applications to solve problems reveal in engineering e.g. length, area, work, volume, mass center and etc. After this course, students will be familiar with solving some engineering problems using numerical integral methods. Also they study multivariable functions to model and analayse engineering problems. Students learn partial differential and how to apply it to the engineering problems find optimum solution. Linear algebra including modeling problems in terms of matrices and system of linear equations and methods of their solutions is another topic will be taught in this module. Finally, students learn about gradient, Laplacian, curl and vector fields.

COURSE CODE : SOU20011
COURSE : Critical Reading and Writing
NO. OF ECTS : 6
PRE-REQUISITE : None

The course introduces the basics of academic skills of reading and writing. This includes reading comprehension, vocabulary, and critical thinking. Writing good sentences with correct word order, tense, and punctuation. Later in the course, after students master the techniques of writing good sentences, students practice writing paragraphs and essays.

COURSE CODE : SOU20012
COURSE : General Physics
NO. OF ECTS : 6
PRE-REQUISITE : None

This course is designed to provide students with principles of mechanics to enable a better understanding of physical phenomena, such as the kinematics and dynamics of point masses and solid bodies. Students will acquire the capacity to quantitatively analyze these effects with the appropriate theoretical tools.

COURSE CODE : SOU20013
COURSE : Academic Debate
NO. OF ECTS : 6
PRE-REQUISITE : None

Academic debate is defined as a debate conducted under the auspices of an educational institution aimed

at providing educational opportunities for its students. The purpose of an academic debate is to allow evenly matched opponents to present balanced arguments and evidence about critical issues.

COURSE CODE : SOU20114
COURSE : Civil Engineering Graphics (CAD Drawing)
NO. OF ECTS : 6
PRE-REQUISITE : None

The course introduces the basics and principles of technical drawings, create and interpret engineering drawing, enhance the communication of engineering drawings and product design and explore the Auto-CAD programme to the students accurately.

COURSE CODE : SOU20114
COURSE : Partial Differential Equations
NO. OF ECTS : 6
PRE-REQUISITE : Engineering Mathematics

This module introduces students to the formulation, methodology, and techniques for analytical solution of engineering problems. Differential equations are useful in the analysis and modelling of engineering problems. The module includes both "ordinary differential equations (ODEs)" and "partial differential equations (PDEs)". ODEs stands for the equations including a one-variable function and its derivatives while PDEs stand for an equation of a multivariable function and its partial derivatives. Students learn about these equations and modelling engineering problems by them. Also, after this course they will be familiar with techniques of solving ODEs and PDEs.

COURSE CODE : SOU20121
COURSE : Statics
NO. OF ECTS : 6
PRE-REQUISITE : General Physics

This course is designed to familiarize students with the conceptualize Engineering Mechanics (Statics) Fundamental and prepare students for other upcoming modules (Strength of Materials, Structural Analysis, R.C Structures, Steel Structure). This course focuses on linking theoretical concepts to their practical parts that are related to industry (e.g. moment of inertia and analyzing of plane trusses) and developing collaborative skills to illustrate students how to work as a group, how to negotiate, compromise and tolerance in a group.

COURSE CODE : SOU20122
COURSE : Chemistry for Civil Engineers
NO. OF ECTS : 5
PRE-REQUISITE : None

This course covers the fundamentals of the basic concepts of engineering chemistry for engineers such as stoichiometry calculations, physical properties of materials related to cement, water, coarse and fine aggregate. The course provides the cement industry and the pollution control, as well as water sewage and water treatment technology.

COURSE CODE : SOU20123
COURSE : Geomatics
NO. OF ECTS : 8
PRE-REQUISITE : None

This course is designed to provide students with principles of surveying engineering as a main branch of geomatics specialty. This course covers using the surveying instruments and create profile, cross-section, contour line, area & volume of cross-section, establishing a coordinate system and angle measurement.

COURSE CODE : SOU20124
COURSE : Dynamics
NO. OF ECTS : 5
PRE-REQUISITE : General Physics

This course covers the fundamentals of the basic concepts of position, velocity and acceleration, the motion of a moving particle along a straight line, the motion of a projectile (along a curve line), the implementation of different coordinate systems in solving dynamics problems, the motion of blocks suspended from pulleys and cables (absolute dependent motion of two particles), the use of Newton's second law of motion in dynamics, force and acceleration concept in dynamics, the equation of motion using kinetics principles and the formulation of the equation of motion kinetically using rectangular coordinates.

COURSE CODE : SOU20130
COURSE : Probability and Statistics
NO. OF ECTS : 5
PRE-REQUISITE : None

Civil engineering students are required to take courses in statistics and probability so they are able to apply risk analysis and probability theory to real-life scenarios. This module covers topics such as descriptive statistics, elementary probability, random variables and distributions, mean, variance, regression and analysis of variance. Practical applications and computer analysis are a key element of this module.

COURSE CODE : SOU20131
COURSE : Strength of Materials
NO. OF ECTS : 7
PRE-REQUISITE : Statics

This course is designed to familiarize students with the mechanical properties of materials. This course is designed to provide future engineers with means of analyses and design of various loads bearing structures or members and analysis and design of a given structure involve the determination of stresses and deformations, linking theoretical concepts to their practical parts that are related to industry (e.g. analyzing materials based on their stress, strain and modulus of elasticity) and also developing collaborative skills to illustrate students' ability to work in groups negotiate compromise and tolerate others.

COURSE CODE : SOU20032
COURSE : Fluid Mechanics
NO. OF ECTS : 6
PRE-REQUISITE : Statics

This course serves as a quantitative introduction to the principles of fluid mechanics and its applications in engineering problems. The course covers the fundamentals of fluid mechanics, including analyzing forces related to hydro and aerostatics as well as hydro and aerodynamics, fluid flows in closed and open channels, and losses in piping systems. Additional topics to be covered include fluid machinery such as pumps and turbines, measurement of flow, and the design of fluid systems. The Lab offers experiments in fundamental and applied fluid mechanics.

COURSE CODE : SOU20133
COURSE : Building Materials Science

NO. OF ECTS : 7
PRE-REQUISITE : None

This course is designed to provide students with an understanding of the fundamentals of materials' behaviour. To enable students to appreciate the relevance of steel, concrete and other civil engineering materials for the design and construction of buildings and civil engineering applications. This module will cover the manufacture as well as the main properties including physical, chemical, mechanical and durability and uses of materials commonly used in civil engineering. It gives a thorough understanding of main aspects of civil engineering materials from first principles. It covers their ingredients and behaviour in the finished structure. In this civil engineering module, it will provide students with a qualitative understanding of the core subject areas of civil engineering materials; however, the main focus will be on concrete.

COURSE CODE : SOU20134
COURSE : Introduction to Environmental Engineering & Science
NO. OF ECTS : 5
PRE-REQUISITE : None

This module provides an introductory overview to different aspects of environmental engineering. The main aim of this module is to teach undergraduate students the fundamental concepts in environmental engineering dealing with water, air, and land pollution.

COURSE CODE : SOU20140
COURSE : Engineering Hydrology
NO. OF ECTS : 5
PRE-REQUISITE : Probability and Statistics

The objective of Hydrology course is to understand the students the main concepts of the sciences of hydrology, applications of these concepts in the field of water engineering and other related fields. Teaching the students, the mathematical equations, empirical, and modelling of hydrologic processes and problems to apply them in the present water engineering issues and researches.

COURSE CODE : SOU20141
COURSE : Construction Materials
NO. OF ECTS : 6
PRE-REQUISITE : None

This module will cover the manufacture as well as the main properties including physical, chemical, mechanical and durability and applications of construction materials commonly. To provide the students with an understanding of the fundamentals of materials behaviour. To enable students to learn the relevance of materials specially concrete for the design and construction of buildings and civil engineering applications. It gives a thorough understanding of main aspects of concrete from first principles. It covers their ingredients and behaviour in the finished structure.

COURSE CODE : SOU20142
COURSE : Structural Analysis - Determinate
NO. OF ECTS : 6
PRE-REQUISITE : Strength of Materials

This module covers the fundamentals of structural analysis. Students will learn idealization of structural components, materials, loads and supports, concepts of statically redundancy, determinacy and stability, analysis of trusses, beams and frames.

COURSE CODE : SOU20143

COURSE : Geology and Geotechnical Engineering
NO. OF ECTS : 6
PRE-REQUISITE : None

This module provides an introductory overview to the engineering geology, rock types, geological structures, methods of site investigation and rock mass classification.

COURSE CODE : SOU20144
COURSE : Engineering Analysis
NO. OF ECTS : 7
PRE-REQUISITE : Partial Differential Equations

A civil engineer must know how to model the problems in terms of mathematics equations, and how to solve those equations and interpret the solutions. Also, numerical analysis and numerical methods in a form suitable for the solution of engineering problems is necessary. An engineer must be familiar with numerical methods to analyse problems numerically. Our aim is to prepare students how to deal with some problems they need during computing in engineering analysis. This module helps them to model problems in mathematical form and promote their accuracy and use advanced numerical methods in solving engineering problems by using computer tools (e. g. MATLAB and EXCEL).

COURSE CODE : SOU20150
COURSE : Reinforced Concrete
NO. OF ECTS : 7
PRE-REQUISITE : Strength of Materials

This module provides an introductory overview with means of analyses and design based on WSDM (Working Stress Design Method) and USDM (Ultimate Strength Design Method) Linking theoretical concepts to their practical application. To have an understanding of reinforced concrete section behaviour if the applied load is incrementally increased to its ultimate stage. To distinguish between un-cracked and cracked reinforced concrete section and evaluate their capacity using different methods. To estimate loads and factor them and reduce the nominal strength with a reduction factor. To understand the real difference between analysis and design for strength evaluation or for designing an RC section for a set of forces.

COURSE CODE : SOU20151
COURSE : Structural Analysis - Indeterminate
NO. OF ECTS : 4
PRE-REQUISITE : Structural Analysis - Determinate

This course is designed to provide students with an understanding of the methods and principles of advanced structural analysis, with emphasis on matrix methods of linear structural analysis, influence line analysis and approximate lateral load analysis and some other methods.

COURSE CODE : SOU20152
COURSE : Hydraulic Engineering
NO. OF ECTS : 4
PRE-REQUISITE : Fluid Mechanics

This course is designed to provide students with a quiet enough amount of knowledge about the types, functions and importance of hydraulic structures such as dams and barrages. The criteria of design and analysis for many cases will be covered. The students will be able to read the contour and topo maps which required for design purposes and the forces applied for structures will be calculated and considered in design. The course will lead the students to be able to carry out the design of structures and analyse the results to check the stability and safety.

COURSE CODE : SOU20153
COURSE : Transportation and Urban Planning
NO. OF ECTS : 7
PRE-REQUISITE : Geomatics

This module provides an introductory overview to basic knowledge in transportation so that students can understand and be able to solve transportation-related problems and design for highway mode of transportation with a focus on highway safety and traffic flow, transportation planning, forecasting travel demand, traffic volume, and management.

COURSE CODE : SOU20154
COURSE : Soil Mechanics
NO. OF ECTS : 8
PRE-REQUISITE : Geology and Geotechnical Engineering

This course is designed to familiarize students to identify the natural processes occurring on surface of earth, basic understanding of fundamentals of soil behavior and soil classification systems. This course will provide students to able to solve a range of soil related problems, especially those involving water flow. Assess the stability of slopes and knowledge about soil mechanics tests will be covered.

COURSE CODE : SOU20160
COURSE : Design of Reinforced Concrete Structures
NO. OF ECTS : 6
PRE-REQUISITE : Reinforced Concrete

This module provides students with basic understanding of the behaviour of reinforced concrete structures and to develop the skill to analyse and design basic concrete members. The module also provides the students skill to differentiate between different types of reinforced concrete columns based on different aspects for analysis and design purposes, to understand and construct the strength interaction diagram of reinforced concrete columns and columns made of elastic homogeneous materials, design and analytical skills of columns with different shapes and symmetries, design and analytical skills of short columns under different set of forces, design and analytical skills of slender columns in laterally braced frames and design for torsion and understand the mechanisms of torsion resistance.

COURSE CODE : SOU20161
COURSE : Foundation Engineering
NO. OF ECTS : 6
PRE-REQUISITE : Soil Mechanics

The course applies the principle of the mechanics and soil mechanics to the provision of safe designs of different types of foundations. This course covers the site exploration, site characterization and the analysis and design of shallow foundations.

COURSE CODE : SOU20162
COURSE : Highway Engineering
NO. OF ECTS : 6
PRE-REQUISITE : Geomatics

The main aim of this course is to provide the students an idea to understand the principles and practices of highway engineering, understand the interactions between transportation planning and land use planning, economics, social planning and master plans. Gain the facility of utilizing the state-of-the-art techniques and models in the field and have the capability to identify and solve highway problems within the context of data availability and limitations of analysis tools. Familiar with essential soil engineering

materials used in practice for pavement construction, understand the importance and behavior of bituminous material in transportation facilities and understand the principles of the pavement design.

COURSE CODE : SOU20163
COURSE : Research Methodology for Graduation Project
NO. OF ECTS : 6
PRE-REQUISITE : None

The course focuses on studying the reviewing of basic research concepts and theories, and highlighting the essentials of research design, data collection and management for scientific research, data processing and analysis. The guidelines of academic writing and publication in peer-reviewed journals are also included.

COURSE CODE : SOU20163
COURSE : Water Resources Engineering Design
NO. OF ECTS : 6
PRE-REQUISITE : Engineering Hydrology

This module provides an overview to understanding of the processes in hydrologic cycle that includes measurement, computation, estimation and determination in each area. Water resources problems, the conception, planning and design of functional elements and facilities to control and utilize water and basic to all water managements are included.

COURSE CODE : SOU20165
COURSE : Municipal Water Supply and Waste Management
NO. OF ECTS : 6
PRE-REQUISITE : Hydraulic Engineering

This module provides an introductory overview of the engineering approaches towards protecting water quality, with an emphasis on fundamental principles. It presents water quality objectives and the chemical, physical, and biological processes necessary for designing and managing drinking water and wastewater treatment plants, theory and conceptual design of systems for treating municipal wastewater and drinking water and the basic principles of common treatment processes.

COURSE CODE : SOU20170
COURSE : Construction Management and Economics
NO. OF ECTS : 6
PRE-REQUISITE : Probability and Statistics & Construction Materials

This module Introduce the basic and principles of engineering management, identify engineering economy principles, introducing the construction process and delivering process.

COURSE CODE : SOU20171
COURSE : Design of Steel Structures
NO. OF ECTS : 6
PRE-REQUISITE : Structural Analysis - Determinate

The main aim of this course is to provide the students an idea of the most common methods used in steel design structures. The course covers the structural design of steel members and connections. Topics include design loads and the structural design of steel beams, columns, tension members and bolted and welded connections.

COURSE CODE : SOU20172

COURSE : Graduation Project
NO. OF ECTS : 7
PRE-REQUISITE : Research Methodology for Graduation Project

The course focuses on studies of the literature and data collection for the graduation project in a particular area of concentration and under the supervision of one of the department academic members. The course covers directed readings in the literature of civil engineering, introduction to research methods, seminar discussions dealing with special engineering topics of current interest and lab works.

COURSE CODE : SOU20173
COURSE : Sustainability in Civil Engineering
NO. OF ECTS : 6
PRE-REQUISITE : None

This module introduces the concept of sustainability in five major areas of civil engineering: structural, environmental, geotechnical, transportation and construction management to the students. The fundamentals of sustainability within the context of civil engineering and three pillars of environment, economic and social issues will be discussed in this module. In particular, the module concentrates on the engineering properties of materials used in the construction of civil engineering projects such as pavements, bridges, buildings, retaining walls from sustainable point of view. The module considers a deep knowledge and understanding of the growing popularity of sustainability and its implications for the practice of engineering, particularly for the built environment.

COURSE CODE : SOU20174
COURSE : Creativity and Innovation
NO. OF ECTS : 6
PRE-REQUISITE : None

This module focuses on fostering innovative thinking and problem-solving skills within the context of civil engineering projects. Students will explore various techniques to generate creative ideas, learn about the importance of innovation in the field, and work on real-world projects that encourage them to apply creative solutions to engineering challenges. The module may cover topics such as design thinking, brainstorming, prototyping, and the integration of new technologies in civil engineering. Through hands-on projects, discussions, and case studies, students will develop the ability to approach engineering problems from fresh perspectives and develop innovative solutions.

COURSE CODE : SOU20175
COURSE : Traffic Engineering
NO. OF ECTS : 5
PRE-REQUISITE : Transportation and Urban Planning

The main aim of this course is to provide the students an idea to recognize the function and scope of traffic engineering, understand basic traffic stream parameters and models, traffic flow models, and queuing theory, design basic traffic signal phasing and timing plan. Familiar students with stages of the transport planning and prediction models, describe the transportation planning process and apply traffic forecasting methods and have the capability to identify and solve traffic problems within the context of data availability and limitations of analysis tools.

COURSE CODE : SOU20176
COURSE : Earthquake Engineering
NO. OF ECTS : 5
PRE-REQUISITE : Reinforced Concrete

The course on introduction to earthquake engineering provides the fundamental concepts, principles and application of earthquake engineering in seismic analysis and design of structures. The course begins with the Seismology explaining the causes of occurrence of earthquake and its characterization. The seismic analysis of the structures under earthquake excitation is developed. The structural system modeled as discrete and continuous system. The concept of response spectrum analysis procedure to determine structure response and design earthquake forces is explained.

Credits, Grading and GPA

Credits

Soran University is following Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hours of student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GPA Calculating

A: Best 10%
B: Next 25%
C: Next 30%
D: Next 25%
E: Next 10%
F: Fail

Note: the grades A, B, C, D and E are for the success group

Calculation of the Grade Point Average (GPA)

1. Each alphabetical grade is substituted by numerical equivalent: A=5.0, B=4.0, C=3.0, D=2.0 and E=1
2. The numerical equivalent is multiplied by the number of credits for the course
3. The products of the course and credits are totaled
4. The sum is divided by the total number of credits
5. The quotient is calculated to three decimal points
6. GPAs are not rounded up

Program Curriculum Structure (Typical)

Semester 1 (30 ECTS)						
Code	**Module**	**SSWL**	**USSWL**	**ECTS**	**Type**	**Pre-requisite**
SOU20001	General English	59	90	7	B	
SOU20002	Calculus	61	105	7	S	
SOU20003	Kurdology	59	60	5	B	
SOU20004	Information Technology	75	80	6	B	
SOU20105	Introduction to Civil Engineering	59	70	5	S	

Semester 2 (30 ECTS)						
Code	**Module**	**SSWL**	**USSWL**	**ECTS**	**Type**	**Pre-requisite**
SOU20010	Engineering Mathematics	61	98	6	S	SOU20102
SOU20011	Critical Reading and Writing	59	98	6	B	
SOU20012	General Physics	73	75	6	S	
SOU20013	Academic Debate	59	65	6	B	
SOU20114	Civil Engineering Graphics (CAD Drawing)	62	75	6	S	

Semester 3 (30 ECTS)						
Code	**Module**	**SSWL**	**USSWL**	**ECTS**	**Type**	**Pre-requisite**
SOU20020	Partial Differential Equations	98	159	6	S	SOU20110
SOU20121	Statics	75	149	6	C	SOU20112
SOU20122	Chemistry for Civil Engineers	56	102	5	S	
SOU20123	Geomatics	100	176	8	C	
SOU20124	Dynamics	77	123	5	C	SOU20112

Semester 4 (30 ECTS)						
Code	**Module**	**SSWL**	**USSWL**	**ECTS**	**Type**	**Pre-requisite**
SOU20130	Probability and Statistics	60	70	5	S	
SOU20131	Strength of Materials	88	90	7	C	SOU20121
SOU20032	Fluid Mechanics	75	98	6	C	SOU20121
SOU20133	Building Materials Science	75	95	7	C	
SOU20134	Introduction to Environmental Engineering & Science	46	56	5	C	

Semester 5 (30 ECTS)						
Code	**Module**	**SSWL**	**USSWL**	**ECTS**	**Type**	**Pre-requisite**
SOU20140	Engineering Hydrology	60	70	5	C	SOU20130
SOU20141	Construction Materials	61	86	6	C	
SOU20142	Structural Analysis - Determinate	74	77	6	C	SOU20131
SOU20143	Geology and Geotechnical Engineering	74	75	6	C	
SOU20144	Engineering Analysis	74	98	7	S	SOU20120

Semester 6 (30 ECTS)						
Code	**Module**	**SSWL**	**USSWL**	**ECTS**	**Type**	**Pre-requisite**
SOU20150	Reinforced Concrete	88	86	7	C	SOU20131
SOU20151	Structural Analysis - Indeterminate	46	56	4	C	SOU20142
SOU20152	Hydraulic Engineering	46	56	4	C	SOU20032
SOU20153	Transportation and Urban Planning	89	81	7	C	SOU20123
SOU20154	Soil Mechanics	89	112	8	C	SOU20143

Semester 7 (30 ECTS)						
Code	**Module**	**SSWL**	**USSWL**	**ECTS**	**Type**	**Pre-requisite**
SOU20160	Design of Reinforced Concrete Structures	59	91	6	C	SOU20150
SOU20161	Foundation Engineering	59	91	6	C	SOU20154
SOU20162	Highway Engineering	59	91	6	C	SOU20123
SOU20163	Research Methodology for Graduation Project	59	90	6	C	
SOU20164	Water Resources Engineering Design	59	91	6	E	SOU20140
SOU20165	Municipal Water Supply and Waste Management	59	91	6	E	SOU20152

Semester 8 (30 ECTS)						
Code	**Module**	**SSWL**	**USSWL**	**ECTS**	**Type**	**Pre-requisite**
SOU20170	Construction Management and Economics	60	84	6	C	SOU20130&20141
SOU20171	Design of Steel Structures	60	91	6	C	SOU20142
SOU20172	Graduation Project	57	120	7	C	SOU20163
SOU20173	Sustainability in Civil Engineering	73	70	6	E	

SOU20174	Creativity and Innovation	73	70	6	E	
SOU20175	Traffic Engineering	59	70	5	E	SOU20153
SOU20176	Earthquake Engineering	59	70	5	E	SOU20150

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