پوهنتون کاردان
KARDAN UNIVERSITY

Course Catalogue

For Bachelor's in Civil Engineering

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Program Introduction

Civil Engineering is one of the oldest Engineering professions. Students working on their Bachelor of Civil Engineering degree have some flexibility in designing a curriculum to meet their needs and interests. After laying a strong foundation in math, science, engineering through required courses, students may begin taking technical electives in one of the main focus areas--structural, geotechnical, environmental, water resources, transportation, or railroad. Active research ensures that the content of the undergraduate program is constantly renewed and maintained at a challenging technical level and integrates discovery learning into the program.

The general character of the Civil Engineering curriculum is oriented both towards providing the students with fundamental training in Civil Engineering disciplines and towards enabling them to acquire the capabilities needed to adapt to the rapidly changing technological and scientific requirements of Afghanistan and the region. In order to achieve the overall objectives of this curriculum the department has established extensive instructional and research laboratories.

Through various combinations of electives, the student is able to go into more depth in one of the sub-disciplines of Civil Engineering, or develop his interest more generally. The sub-disciplines presently offered are:

- Structural Engineering.
- Construction Management and Engineering
- Geotechnical Engineering
- Transportation Engineering
- Water Resources
- Environmental Engineering
- Geomatics Engineering

Course Curriculum

Course Curriculum

Core Courses				
No.	**Code**	**Course Name**	**Pre-Requisite**	**Credits**
1	ET 2011	Calculus I		3
2	ET 2014	Calculus II	Calculus I	3
3	ET 2021	Calculus III	Calculus II	3
4	ET 2025	Differential Equations	Calculus III	3
5	ET 2016	Physics I		3
6	ET 2022	Physics II	Physics I	3
7	ET 2013	Introduction to Engineering		3
8	ET 2024	Chemistry For Engineers		3
9	ET 2027	Engineering Geology		3
10	ET 2017	Construction Material		3
11	ET 2012	Technical Drawing I		3
12	ET 2012	Technical Drawing I (Lab)		1
13	ET 2015	Technical Drawing II	Technical Drawing I	3
14	ET 2015	Technical Drawing II (Lab)		1
15	ET 2023	Static		3
16	ET 2026	Strength of Materials	Static	3
17	ET 2026	Strength of Materials (Seminar)		1
18	ET 2032	Structural Analysis I	Strength of Materials	3
19	ET 2039	Structural Analysis II	Structural Analysis I	3
20	ET 2036	Concrete I	Structural Analysis II	3
21	ET 2036	Concrete I (Lab)		1
22	ET 2041	Concrete II	Concrete I	3
23	ET 2041	Concrete II (Lab)		1
24	ET 2044	Foundation Engineering	Soil Mechanics	3
25	ET 2044	Foundation Engineering (Seminar)		1
26	ET 2043	Steel Design		3
27	ET 2035	Fluid Mechanic		3
28	ET 2035	Fluid Mechanic (Seminar)		1
29	ET 2034	Hydrology		3
30	ET 2038	Hydraulics		3
31	ET 2038	Hydraulics (Seminar)		1
32	ET 2045	Water Supply		3

33	ET 2028	Surveying I		3
34	ET 2028	Surveying I (Lab)		0.5
35	ET 2033	Surveying II	Surveying I	3
36	ET 2033	Surveying II (Lab)		0.5
37	ET 2037	Soil Mechanics		3
38	ET 2037	Soil Mechanics (Practical)		1
39	ET 2031	Transportation Engineering		3
40	ET 2042	Highway Engineering	Transportation Engineering	3
41	ET 2042	Highway Engineering (Seminar)		1
42	ET 2046	Environmental Engineering		3
43	ET 2047	Waste Water Engineering		3
44	ET 2049	Construction Project Management		3
45	ET 2049	Construction Proj. Mgt. (Seminar)		1
Total Courses				**32**
Total Credits				**108**

General Courses

No.	Code	Course Name	Pre-requisite	Credits
1		Professional Development		15
2		Languages		6
3		General Knowledge		15
Total Courses				**12**
Total Credits				**36**

Thesis

No.	Code	Course Name	Pre-requisite	Credits
1		Undergraduate Thesis		6
Total Courses				**1**
Total Credits				**6**

Summary

No.	Category	Credits	Percentage
1	Core	108	72%
2	Specialization	0	0%
3	General	36	24%
4	Thesis	6	4%
Total		**150**	**100%**

Graduation Requirements		
No.	**Category**	**Criteria**
1	University Orientation	Pass
2	Credit Requirement	150 Credits
3	Thesis Defense	Pass
4	English Competency Test	Pass
5	Professional Seminars	6 Hours

Individual Course Descriptions

Core Courses

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Calculus I**
Credits	**3**
Course Code	**ET 2011**
Lecturer	**Mirwais Ahmadzai**
Category	**Core**
Pre-requisite	**None**
Description	Calculus I is a first course in the calculus of one variable intended for Civil Engineering students. It is open to others who are qualified and desire a more rigorous mathematics course at the core level. Topics include a brief review of polynomials, trigonometric, exponential, and logarithmic functions, followed by discussion of limits, derivatives, and applications of differential calculus to real-world problem areas. An introduction to integration concludes the course.
LEARNING OUTCOMES	After successfully completing this course, students will be able to: • To help students develop and refine basic algebra skills by way of an integrated review of these skills as they are needed in the course. • To promote problem-solving and critical thinking skills through the application of algebraic concepts to common situations. • To enhance learning and understanding of algebraic concepts through the integrated use of graphing calculators. • To promote and utilize the "Rule of Four": All concepts are explored algebraically, numerically, graphically and in context with applications. • To know the students about functions and their graphs. • To incorporate writing into the curriculum. • To provide a sufficient algebra background. • To help strengthen students' general academic skills.
Delivery Method	Lecture/ Seminar
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Calculus II**
Credits	**3**
Pre-requisite	**Calculus I**
Course Code	**ET 2014**
Lecturer	**Mirwais Ahmadzai**
Category	**Core**
Description	Calculus II is a second course in the calculus of one variable intended for biology, computer science, economics, management, and premedical students. It is open to others who are qualified and desire a more rigorous mathematics course at the core level. Topics include an overview of integration, basic techniques for integration, a variety of applications of integration, and an introduction to (systems of) differential equations.
LEARNING OUTCOMES	After successfully completing this course, students will be able to: • Distinguish between the indefinite integral and the definite integral. • Define the definite integral as a limit of Riemann sums and interpret it as area. • Explain the Fundamental Theorem of Calculus, showing how differentiation and integration are related. • Evaluate an integral by the method of substitution. • Use integrals to calculate areas between curves, volumes, work, and average value of a function. • Evaluate integrals, using the techniques of integration by parts, using trigonometric identities and trigonometric substitution, and using partial fractions.
Delivery Method	Lecture/ Seminar
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Calculus III**
Credits	**3**
Pre-requisite	**Calculus II**
Course Code	**ET 2021**
Lecturer	**Mirwais Ahmadzai**
Category	**Core**
Description	This is the third in calculus sequence. The distinct feature of this part of the course is its focus on the multi-dimensional analysis, as opposed to one-dimensional analysis that you learned in (Calculus I) and (Calculus II). This semester you will get familiar with such important concepts as a vector, a vector field, a function of several variables, partial derivative, a line-integral and multi-variable integrals. The ideas of the vector calculus apply to numerous areas of human knowledge such as engineering, physics, pure mathematics, biology, and many others. Some of them we will see in the course, some will surface later in your future special courses, yet some may wait until you become a professional.
LEARNING OUTCOMES	After successfully completing this course, students will be able to: • Use Definite & indefinite integrals in practical purposes. • Use integrals to calculate areas between curves, volumes, work, and average value of a function. Evaluate integrals, using the techniques of integration by parts, using trigonometric identities and trigonometric substitution, and using partial fractions
Delivery Method	Lecture/ Seminar
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Differential Equation**
Credits	**3**
Pre-requisite	**Calculus III**
Course Code	**ET 2025**
Lecturer	**Mirwais Ahmadzai**
Category	**Core**

Description	The construction of mathematical models to address real-world problems has been one of the most important aspects of each of the branches of science. It is often the case that these mathematical models are formulated in terms of equations involving functions as well as their derivatives. Such equations are called differential equations. If only one independent variable is involved, often time, the equations are called ordinary differential equations. The course will demonstrate the usefulness of ordinary differential equations for modeling physical and other phenomena. Complementary mathematical approaches for their solution will be presented, including analytical methods, graphical analysis and numerical techniques.
LEARNING OUTCOMES	**Analytics** – By learning about Differential Equations, student should be able to prepare, analyze and interpret relevant Engineering Problems. • Evaluate limits using basic limit theorems. • State and apply the definition of continuity to determine a function's points of continuity and discontinuity. • Differentiate elementary functions using basic derivative theorems and the definition of the derivative. • Integrate elementary functions using basic integral theorems and the definition of the definite integral. • Solve derivative application problems including optimization, related rates, linearization and curve sketching and rectilinear motion

Delivery Method	Lecture/ Seminar
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Physics I**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2016**
Lecturer	**JT. Assistant Khabir Roian**
Category	**Core**
Description	Physics I course is designed to enable you to develop the ability to reason about physical phenomena using important science process skills such as explaining causal relationships, applying and justifying the use of mathematical routines, designing experiments, analyzing data and making connections across multiple topics within the course
LEARNING OUTCOMES	**Analytics –** By learning about Physics - 1, students should be able to understand key terminologies, and they should be able to use proper unit of measurement for every desired thing. Also, analytic comprehension of students should grow and to be developed. In addition, students should get the ability to draw conclusion from a civil engineering related mathematical problem. **Critical Thinking:** By solving problems, learning theory and analyzing Physics -1 results students will be able to practice and enhance their critical thinking. **Reflective Thinking:** Students will practice reflective thinking by participating in class discussions, answering questions. Students will also display reflective thinking by practicing problems, homework and team term paper.
Delivery Method	**Lecture/ Seminar**
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	**see course outline**
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Physics II**
Credits	**3**
Pre-requisite	**Physics I**
Course Code	**ET 2022**
Lecturer	**JT. Assistant Khabir Roian**
Category	**Core**
Description	Physics II course is designed to enable you to develop the ability to reason about physical phenomena using important science process skills such as explaining causal relationships, applying and justifying the use of mathematical routines, designing experiments, analyzing data and making connections across multiple topics within the course.
LEARNING OUTCOMES	After successfully completing this course, students will be able to: After studying this course a student will be able to: • Understand the significance and role of physics of modern technology. • Becomes acquainted with the basic principles of physics as applied in the study of relevant Technology. • To develop a simple model that can be used to explain a complex situation. • To formulate an approach to solving real-world problems. • To define vocabulary used in Physics. • To employ the physics to solve real-world physics problems.
Delivery Method	Lecture/ Seminar
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Introduction to Engineering**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2013**
Lecturer	**Fahim Afghan**
Category	**Core**
Description	Introduction to selected subfields in the discipline, such as structural engineering, construction project management, and environmental engineering. Problem-solving exercises apply fundamental concepts from these subfields to integrate the steps of analysis, synthesis, and evaluation through individual homework assignments and group projects that require attention to a broad range of issues. The course also exposes the students to issues related to engineering practice such as working in teams, scheduling, evaluating risk, and making ethical decisions.
LEARNING OUTCOMES	Introduces students to the profession, including the disciplines of chemical, civil, computer, electrical, environmental, and mechanical engineering. Problem-solving exercises apply fundamental concepts from these subfields. Integrate the steps of analysis, synthesis, and evaluation through individual homework assignments and group projects that require attention to a broad range of issues. The course also exposes the students to issues related to engineering practice such as working in teams, scheduling, evaluating risk, and making ethical decisions.
Delivery Method	Lecture/ Seminar
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Chemistry for Engineers**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2024**
Lecturer	**Farid Gul**
Category	**Core**

Description	The purpose of this course is to familiarize you to the ideas and processes of Engineering Chemistry from the standpoint of the user. It is assumed that you are learning for, or are in, an engineering position as opposed to purely engineering standards. Therefore the focus will be on how to use facts more than how to create them. You will find that we cover material that you have been exposed to in other courses in the program, such as Strength of Material, Soil Mechanics, Environmental Engineering and Engineering Material.
LEARNING OUTCOMES	After successfully completing this course, students will be able to: Understand the significance and role of chemistry of modern technology. • Becomes acquainted with the basic principles of chemistry as applied in the study of relevant Technology. • Knows the Scientific methods for production' properties and uses of materials of industrial and technological significance. • Gain skill for the efficient conduct of practical in a chemistry Lab.

Delivery Method	Lecture/ Seminar/lab work
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Engineering Geology**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2027**
Lecturer	**JT. Assistant Khan Muhammad**
Category	**Core**
Description	The goal of the Engineering Geology program at the BCE is to educate and train through teaching, research, and service the critical thinking and communication skills necessary to help solve engineering problems and design engineering systems within the context of the natural earth. Students will be capable of utilizing their background in engineering and earth sciences to provide solutions to engineering problems within the context of the natural world.
LEARNING OUTCOMES	The purpose of this course is to introduce you to the concepts and procedures of engineering geology. At the conclusion of engineering geology Course, you should be able to justify your choice of civil engineering as a major. The goal of the Engineering Geology program at the BCE is to educate and train through teaching, research, and service the critical thinking and communication skills necessary to help solve engineering problems and design engineering systems within the context of the natural earth. Students will be capable of utilizing their background in engineering and earth sciences to provide solutions to engineering problems within the context of the natural world.
Delivery Method	Lecture/ Seminar/site visit
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Construction Material**
Credits	**3**
Pre-requisite	**None**
Course Code	ET 2017
Lecturer	**Mustafa Tasal**
Category	Core
Description	The subject of engineering materials has advanced greatly in the last few decades. As a result, many of the conventional materials have either been replaced by more efficient materials or modified to improve their performance. Civil and construction engineers have to be aware of these advances and be able to select the most cost-effective materials or use the appropriate modifier for the specific application at hand.
LEARNING OUTCOMES	**Analytics** – By learning about engineering materials, students should be able to understand key terminologies, and they should be able to use proper unit of measurement for every desired thing. Also, analytic comprehension of students should grow and to be developed. In addition, students should get the ability to draw conclusion from a civil engineering related problem. **Reflective Thinking:** Students will practice reflective thinking by participating in class discussions, answering questions. Students will also display reflective thinking by practicing problems, homework and team term paper.
Delivery Method	Lecture/ Seminar/lab work
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Drawing I**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2012**
Lecturer	**JT. Assistant Mir Sebqhatullah**
Category	**Core**
Description	This class will introduce students to the manufacturing design language of our industrial world. It is a beginning course providing students with an opportunity to develop skills in making and using technical drawings. Students begin with the basics of equipment and material usage, and then proceed through fundamental drawing techniques and procedures. The student should have a good background in basic mathematics. This course is especially beneficial for students interested in careers related to production design, engineering, drafting, commercial art, graphic arts, and construction.
LEARNING OUTCOMES	Upon completion of the course student should be able to: • Introduce GRAPHICS LANGUAGE, technical Drawing, and Drawing Standard and Drawing Tools. • Learn Drawing history and Drawing types. • Using various types of drawing tools to draw lines, Arch, and circles by hand. • Knowing Lettering Standard, and Line Convention. • Prepare various types of pictorial drawing (Isometrics, Oblique, and Perspectives) and orthographic projection (Multi view Drawings) by hand. • Describe and drawn Sections and section types. • Provide the measurements that used for objects or Dimensions. • Prepare an essential part of the drawing process that is scale.
Delivery Method	Lecture/ Seminar/lab work/Practical
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Drawing II**
Credits	**3**
Pre-requisite	**Drawing I**
Course Code	**ET 2015**
Lecturer	**JT. Assistant Mir Sebqhatullah**
Category	**Core**
Description	In this course students will rely on Architectural Drafting and Design for easy-to-read, comprehensive coverage of architectural drafting and design instruction that complies with and reinforced architectural, engineering, and construction industry standards and practices. The content can be used as presented by following a logical sequence of learning activities for residential architectural drafting and design, or the chapters can be rearranged to accommodate alternate formats for traditional or individualized instruction.
LEARNING OUTCOMES	Upon completion of the course student should be able to: • Introduce Architecture, Architect and Architectural Drawing. • Learn Drawing history and Drawing types. • Prepare various types of pictorial drawing and orthographic projection drawing by hand and CAD. • Describe items that are associated in the building, such as doors, windows, cabinets, and plumbing fixtures. • Provide the measurements that used for construction or Dimensions. • Prepare an essential part of the design and drawing process that is Elevations. • Drawn the vertical relationships of the structural materials or Sections. • Structure process that outlines the parameters of generally accepted sequences of tasks that occur from the point at which a designer or space planner begins to work on a project to the point at which the project is complete and occupied by mean of Design Methodology. • Know various types of residential houses and landscape.
Delivery Method	Lecture/ Seminar/lab work/Practical
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Static**
Credits	**3**
Pre-requisite	**Physics I**
Course Code	**ET 2023**
Lecturer	**JT. Assistant Ajmal Wardak**
Category	**Core**
Description	This course introduces the concepts of engineering based on forces in equilibrium. Topics include concentrated forces, distributed forces, forces due to friction, and inertia as they apply to machines, structures, and systems. Upon completion, students should be able to solve problems which require the ability to analyze systems of forces in static equilibrium. This course has been approved to satisfy the Comprehensive articulation agreement for transferability as a pre-major and/or elective course requirement.
LEARNING OUTCOMES	1. Students will be able to draw complete free body diagrams and write appropriate equilibrium equations from the free body diagram, including the support reactions. Students will display proficiencies by demonstrating the following competencies: a. Describe position, forces, and moments in terms of vector forms in two and three dimensions. b. Determine rectangular and nonrectangular components of a force. c. Determine the resultant of a force system including distributed forces. d. Simplify systems of forces and moments to equivalent systems. 2. Students will be able to apply the concepts of equilibrium to various structures. Students will display proficiencies by demonstrating the following competencies: a. Evaluate forces in trusses, frames and machines. b. Determine the internal forces in a structure. c. Analyze systems that include frictional forces. 3. Students will be able to calculate moments, centers of mass, and forces for particular structures. Students will display proficiencies by demonstrating the following competencies: a. Centers of gravity and centroids for: 1) Discrete particles and a body of arbitrary shape. 2) A body having axial symmetry. b. The resultant force of a pressure loading by a fluid. c. The moments of inertia for an area.
Delivery Method	Lecture/ Seminar/problem Solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Strength of Material**
Credits	**4**
Pre-requisite	**Static**
Course Code	**ET 2026**
Lecturer	**JT. Assistant Ajmal Wardak**
Category	**Core**
Description	This course studies the behavior of a variety of materials under normal, shear, torsional, bending and combined loads. The concepts of stress, strain, creep, corrosion, fatigue and material properties are explored. The course examines observed behavior in light of the relationships between the microscopic structure and macroscopic properties of materials used in engineering applications. The loading, geometry, functional environment and material properties of machine or structural parts are used to relate the forces applied to a body to the resulting internal forces and deformations so that performance can be evaluated.
LEARNING OUTCOMES	**Analytics** – By learning about strength of material, student should be able to learn about the variety of materials used by engineers in the design and construction of modern structures. They also find out about the material properties important to structure construction and consider the advantages and disadvantages of steel and concrete as common bridge-building materials to handle compressive and tensile forces. **Critical Thinking:** By solving problems, learning theory and analyzing strength of material results students will be able to practice and enhance their critical thinking. **Reflective Thinking:** Students will practice reflective thinking by participating in class discussions, answering questions. Students will also display reflective thinking by practicing problems, homework and team term paper.
Delivery Method	Lecture/ Seminar/lab work /problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Structure Analysis I**
Credits	**3**
Pre-requisite	**Strength of material**
Course Code	**ET 2032**
Lecturer	**JT. Assistant Sayed Dawood**
Category	**Core**
Description	In this course you will learn three fundamental methods of indeterminate structural analysis and be introduced to the engineering design process. You will be applying the principles from previous math, physics, and mechanics courses throughout this course and we will work to maximize the use of your computer in support of our work. In addition our goal is to provide you with a solid foundation in understanding structural behavior. This course has 6 specific objectives. They can be generally grouped and summarized as learning about structural analysis and design procedures and their role, specific methods of analysis, structural behavior (both internal and external), and applying real world constraints and codes to structural analysis.
LEARNING OUTCOMES	**Analytics** – By learning about Structure Analysis 1, student should be able to prepare, analyze and interpret relevant Structure Analysis 1 reports. Students will incorporate and practice this skill by solving Structure Analysis 1 problems. **Critical Thinking:** By solving problems, learning theory and analyzing Structure Analysis 1 results students will be able to practice and enhance their critical thinking. **Reflective Thinking:** Students will practice reflective thinking by participating in class discussions, answering questions. Students will also display reflective thinking by practicing problems, homework and team term paper.
Delivery Method	Lecture/ Seminar/lab work /problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Structure Analysis II**
Credits	**3**
Pre-requisite	**Structure Analysis I**
Course Code	**ET 2039**
Lecturer	**JT. Assistant Sayed Dawood**
Category	**Core**
Description	In this course you will learn three fundamental methods of indeterminate structural analysis and be introduced to the engineering design process. You will be applying the principles from previous math, physics, and mechanics courses throughout this course and we will work to maximize the use of your computer in support of our work. In addition our goal is to provide you with a solid foundation in understanding structural behavior. This course has 6 specific objectives. They can be generally grouped and summarized as learning about structural analysis and design procedures and their role, specific methods of analysis, structural behavior (both internal and external), and applying real world constraints and codes to structural analysis.
LEARNING OUTCOMES	**Analytics** – By learning about Structure Analysis 2, student should be able to prepare, analyze and interpret relevant Structure Analysis 2 reports. Students will incorporate and practice this skill by solving Structure Analysis 2 problems. **Critical Thinking:** By solving problems, learning theory and analyzing Structure Analysis 2 results students will be able to practice and enhance their critical thinking. **Reflective Thinking:** Students will practice reflective thinking by participating in class discussions, answering questions. Students will also display reflective thinking by practicing problems, homework and team term paper.
Delivery Method	Lecture/ Seminar/lab work /problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Concrete I**
Credits	**4**
Pre-requisite	**Structure Analysis II**
Course Code	**ET 2036**
Lecturer	**JT. Assistant Sayed Dawood**
Category	**Core**
Description	Reinforcement Concrete 1 (RCC 1), builds on the fundamentals of statics, mechanics of materials, and structural analysis, and applies them to the design of reinforced concrete members. In RCC 1, you will perform structural design as it is done in engineering practice, using the American Concrete Institute 318M-05 design specification.
LEARNING OUTCOMES	**Analytics** – By learning about Reinforced Concrete 1, student should be able to prepare, analyze and interpret relevant Reinforced Concrete 1 reports. Students will incorporate and practice this skill by solving Reinforced Concrete 1 problems. **Critical Thinking:** By solving problems, learning theory and analyzing Reinforcement Concrete results students will be able to practice and enhance their critical thinking. **Reflective Thinking:** Students will practice reflective thinking by participating in class discussions, answering questions. Students will also display reflective thinking by practicing problems, homework and team term paper.
Delivery Method	Lecture/ Seminar/lab work /problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Concrete II**
Credits	**4**
Pre-requisite	**Concrete I**
Course Code	**ET 2041**
Lecturer	**Abdul Towfiq Poya**
Category	**Core**
Description	The purpose of this course is to introduce you with an introduction to reinforced concrete design. To the design of entire building systems such as RCC two way slabs, short and long columns, shear walls design, serviceability, cantilever design and stair case design. Reinforced concrete design encompasses both the art and science of engineering. This subject presents the theory of reinforced concrete design as a direct application of the laws of statics and mechanics of materials. It emphasizes that a successful design not only satisfies design rules, but is capable of being built in a timely fashion for a reasonable cost and should provide a long service life.
LEARNING OUTCOMES	The purpose of this course is to introduce you with an introduction to reinforced concrete design. To the design of entire building systems such as:RCC two way slabs, short and long columns, shear walls design, serviceability, cantilever design and stair case design.
Delivery Method	Lecture/ Seminar/lab work /problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Foundation Engineering**
Credits	**4**
Pre-requisite	**None**
Course Code	**ET 2044**
Lecturer	**JT. Assistant Sayed Dawood**
Category	**Core**
Description	Focuses on geotechnical design of shallow and deep foundations, including spread footings, mats, driven piles, and drilled piers. Coverage includes bearing capacity, settlement, group effects, and lateral load capacity of the various foundation types. Additional topics include subsurface exploration, construction of deep foundations, and analysis of pile behavior using wave equation and dynamic monitoring methods.
LEARNING OUTCOMES	**Analytics** – By learning about Foundation Engineering, student should be able to prepare, analyze and interpret relevant Foundation Engineering reports. Students will incorporate and practice this skill by solving Foundation Engineering problems. **Critical Thinking:** By solving problems, learning theory and analyzing Foundation Engineering results students will be able to practice and enhance their critical thinking. **Reflective Thinking:** Students will practice reflective thinking by participating in class discussions, answering questions. Students will also display reflective thinking by practicing problems, homework and team term paper.
Delivery Method	Lecture/ Seminar/lab work /problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Steel Design**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2043**
Lecturer	**JT. Assistant Gul Rahman Abdulrahimzai**
Category	**Core**
Description	Design of Steel, consolidates the Intro to Engineering Mechanics and Design, Mechanics of Materials, and Structural Analysis, and applies them to the design of steel and masonry structural members. In Unified Steel Design, you will perform structural design as it is done in engineering practice, using the American Institute of Steel Construction Manual of Steel Construction (MSC) and applicable masonry codes and tables from the masonry text. In the process, you will be encouraged to use computer-based design tools.
LEARNING OUTCOMES	After successfully completing this course, students will be able to: 1. Given a set of functional requirements and an architectural concept, design a low-rise building using steel and masonry. 2. Describe the advantages and disadvantages of using structural steel and masonry as building materials. 3. Apply the LRFD and ASD methodologies. 4. Use steel to create lateral load-resisting systems. 5. Reduce real-world 3 dimensional frames to a 2 dimensional model, accounting for the applied loads, connected members, and out of plane behavior. 6. Design structural steel members for axial, flexural and combined loading. 7. Design tension and shear steel connections.
Delivery Method	Lecture/ Seminar/problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Fluid Mechanics**
Credits	**4**
Pre-requisite	**None**
Course Code	**ET 2035**
Lecturer	**Abdul Towfiq Poya**
Category	**Core**
Description	Properties of fluids; Fluid statics; Fluid in motion and the conservation of mass; Pressure variation in laws; Momentum and energy principles; Dimensional analysis and similitude; Application in civil engineering: pipe flow, pipe networks, and open channel analysis. Our classes will work for you if you read your textbook before class. I provide you assignments often. You should focus on solving sample problems. Quizzes will be taken during the semester so you need to be ready all the time.
LEARNING OUTCOMES	**Analytics** – By learning about Fluid Mechanics, student should be able to prepare, analyze and interpret relevant problems. Students will incorporate and practice this skill by solving sample problems and exercise problems. **Critical Thinking:** By solving problems, learning theory and analyzing Fluid Mechanics results students will be able to practice and enhance their critical thinking. **Reflective Thinking:** Students will practice reflective thinking by participating in class discussions, answering questions. Students will also display reflective thinking by practicing problems, homework and team term paper.
Delivery Method	Lecture/ Seminar/problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Hydrology**
Credits	**4**
Pre-requisite	**None**
Course Code	**ET 2034**
Lecturer	**Assistant Professor Hamid Hafizi**
Category	**Core**
Description	The aim of this course to show why it is important to study hydrology. There is an important engineering role in solving water engineering problems in Afghanistan and internationally. And the purpose of this course is to improve the availability and reliability of surface-water quantity information needed for hazard mitigation, water supply and demand management, and environmental protection. This course explores some critical issues and engineering approaches to their solution. We hope this will make you interested in learning more about hydrologic processes and design.
LEARNING OUTCOMES	1- The aim of this course to show why it is important to study hydrology. There is an important engineering role in solving water engineering problems in Afghanistan and internationally 2- This course explores some critical issues and engineering approaches to their solution 3- This will make interested in learning more about hydrologic processes and design of Hydraulics Structure.
Delivery Method	Lecture/ Seminar/problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Hydraulics**
Credits	**4**
Pre-requisite	**Hydrology**
Course Code	**ET 2038**
Lecturer	**Assistant Professor Hamid Hafizi**
Category	**Core**
Description	The course is designed to introduce the concept of ground water flow hydrology and contamination as an extension of the mandatory fluid mechanics and hydraulics taught in the junior year of the civil engineering curriculum. Ground water flow as well as contaminant transport in the subsurface media are presented at an introductory level as well as presentation of real life case studies.
LEARNING OUTCOMES	• Recognize the role of hydraulic engineers as stewards in control and use of water source and how this role promotes effective management. • Manage natural water flow resource and storm water through hydraulic structures construction. • Application of hydrology and fluid mechanics as basics of water related subjects. • Recognize flow classification and it behavior to hydraulic structures. • Design hydraulic engineering structures for saving of rainy season water and its using in dry weather season and supply of water for drinking and irrigation purposes. • Describe and design essential water supply and irrigation systems. • Describe and design of hydraulic structures such as dames, bridges, culvers and water transportation channels.
Delivery Method	Lecture/ Seminar/problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Water Supply**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2045**
Lecturer	**Abdul Towfiq poya**
Category	**Core**
Description	The purpose of this course is to introduce you with water supply system which are using in civil engineering field and method of water supply system analysis and design in manner of several today modern methods. Water supply engineering is the concept is to provide the reader with an understanding of the analysis and design aspects of water distribution system, with application to sediment transporting pipelines. It includes the pipe flow principles and their application in analysis of water supply system. The other topics cover in this course relate to optimal sizing of water supply gravity and pumping systems.
LEARNING OUTCOMES	Water supply engineering is the concept is to provide the reader with an understanding of the analysis and design aspects of water distribution system, with application to sediment transporting pipelines. It includes the pipe flow principles and their application in analysis of water supply system. The other topics cover in this course relate to optimal sizing of water supply gravity and pumping systems. The chapters structured in such a way to enable an engineer to design functionally efficient and least cost systems. It is also intended to aid students, professional engineers and researchers.
Delivery Method	Lecture/ Seminar/problem solving
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Surveying I**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2028**
Lecturer	**Parwiz Ahmand**
Category	**Core**
Description	The purpose of this course is to acknowledge students of Engineering Surveying and practically work in the site to conduct engineering topography survey and stake out the designs.
LEARNING OUTCOMES	• To know how Engineering Surveys are conduct • To know measurement and instrumentation of Survey • To know Traverse calculating in practical • To know Profile and Differential leveling and make project • To know Practical work on Leveling in the site
Delivery Method	Lecture/ Seminar/problem solving /practical
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Surveying II**
Credits	**3**
Pre-requisite	**Surveying I**
Course Code	**ET 2033**
Lecturer	**Parwiz Ahmand**
Category	**Core**
Description	The purpose of this course is to acknowledge students of Engineering Surveying and practically work in the site to conduct engineering topography survey and stake out the designs and practically know usage of Total Station.
LEARNING OUTCOMES	• To Know Deferential Global Positioning system • To know and work on Intersection and Resection • To know Circular Curve and types of Circular Curves • To work Design curves of constant radius to join straight section • To set out the center line of circular curve • To know Transition curve and type of transition curve • To know Super elevation • To know and use Vertical curve geometry • Practical session on Total station in the site
Delivery Method	Lecture/ Seminar/problem solving /practical
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Soil Mechanics**
Credits	**4**
Pre-requisite	**None**
Course Code	ET 2037
Lecturer	**JT. Assistant Shah Noor**
Category	**Core**
Description	Geotechnical Engineering combines the study of soil behavior (soil mechanics) with the application of soil behavior to subsurface engineering analysis and design. This is a rigorous course. Throughout the course we will discuss theoretical concepts of soil behavior, analyze in the laboratory and then apply our knowledge to design of earth structures and foundations.
LEARNING OUTCOMES	After successfully completing this course, students will be able to: Along with Structural analysis and Hydraulics and Hydrology Geotechnical Engineering is one of three critical introductory classes to civil engineering you are taking this semester. The primary course objective is to for you to develop an understanding of the role of geotechnical engineering within the broader field of civil engineering. Specifically, you should understand basic concepts of soil behavior and be able to apply these concepts to the design of civil works. Specific course objectives are provided as an enclosure. These objectives encompass the fundamental knowledge we will be building over the course of the semester. Individual lesson objectives are provided in the study notes.
Delivery Method	Lecture/ Seminar/problem solving /lab work
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Transportation Engineering**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2031**
Lecturer	**JT. Assistant Khan Muhammad**
Category	**Core**
Description	The goal of this course is to introduce you to the concepts and design procedures of Traffic and management of signals from the perspective of the user. I assume that you are studying for, or are in, a management position as opposed to a purely Traffic engineering position. Therefore the emphasis will be on how to use information more than how to create it. You will likely find that we cover material that you have been exposed to in other courses in the program, such as Traffic, traffic movement, sign, and signal behavior.
LEARNING OUTCOMES	**Analytics** – By learning about transportation engineering, student should be able to prepare, analyze and Traffic law, regulation and traffic signal design and Engineering Reports. **Critical Thinking:** By solving problems, learning theory and transportation engineering results students will be able to practice and enhance their critical thinking. **Reflective Thinking:** Students will practice reflective thinking by participating in class discussions, answering questions. Students will also display reflective thinking by practicing problems, homework and team term paper.
Delivery Method	Lecture/ Seminar/problem solving /lab work
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Highway Engineering**
Credits	**4**
Pre-requisite	**Transportation Engineering**
Course Code	**ET 2042**
Lecturer	**JT. Assistant Khan Muhammad**
Category	**Core**
Description	At the conclusion of Transportation Course you should be familiar with basics of Traffic Operations, Transportation Planning, Geometric Design, Structural Design of the Pavements, and Pavement Management.
LEARNING OUTCOMES	**Analytics** – By learning about Management Accounting, student should be able to prepare, analyze and interpret relevant management accounting reports. Students will incorporate and practice this skill by solving management accounting problems. **Critical Thinking:** By solving problems, learning theory and analyzing Highway Engineering results students will be able to practice and enhance their critical thinking. **Reflective Thinking:** Students will practice reflective thinking by participating in class discussions, answering questions. Students will also display reflective thinking by practicing problems, homework and team term paper. Students will also display reflective thinking by practicing problems, homework and team term paper.
Delivery Method	Lecture/ Seminar/problem solving /lab work
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Syllabus Design Procedures	see course outline
Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Environmental Engineering**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2046**
Lecturer	**Muhammad Ali Maher**
Category	**Core**
Description	The primary goals are to provide students with a foundation in the theory and principles employed in environmental engineering along with an introduction to the broad array of environmental engineering topics. Students will build upon previously acquired skills in mathematics, physics, chemistry, and policy to solve practical environmental engineering problems.
LEARNING OUTCOMES	Understand the scope and magnitude of global and regional environmental problems. Recognize the role of environmental engineers as stewards in protecting the environment and how this role promotes effective management. Apply environmental assessment, land use planning, and resource management principles to site environmentally sensitive processes. Design environmental engineering solutions using chemical equilibrium and reaction kinetics. Model zero-, first-, and second-order, batch, continuous flow, and plug flow reactors using chemical kinetics and mass balance. Describe and design essential water and wastewater treatment processes.
Delivery Method	Lecture/ Seminar/problem solving /lab work
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Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Waste Water Engineering**
Credits	**3**
Pre-requisite	**None**
Course Code	**ET 2047**
Lecturer	**Muhammad Ali Maher**
Category	**Core**

Description	Application of design principles for a variety of water purification systems, including drinking water, municipal wastewater, industrial wastewater and agricultural wastewater. This involves the design of physical, chemical and biological unit operations, and evaluating the optimum combination to satisfy the given design constraints and criteria. The optimum designs integrate engineering science, basic science, economics, and occupational health and safety for the workers and the public.
LEARNING OUTCOMES	Students who successfully complete this course will be able to: 1. Select or construct appropriate treatment schemes to remove certain pollutants present in water or wastewater. 2. Design a water or wastewater treatment component. 3. Balance chemical reactions and use balanced reactions to determine the distribution of species at equilibrium. 4. Develop a mass balance expression for contaminants under different case scenarios and design a simple system to meet desired needs. 5. Learn how to characterize source water, and the best available technologies (BAT) for physical and chemical treatment of drinking water. 6. Learn how to characterize wastewater, and the BAT for physical, chemical and microbiological treatment of wastewater.

Delivery Method	Lecture/ Seminar/problem solving /lab work
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Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

Faculty	Engineering & Technology
Department	**Civil Engineering**
Subject	**Project Design**
Credits	**4**
Pre-requisite	**Concrete II**
Course Code	**ET 2047**
Lecturer	**Abdul Towfiq Poya**
Category	**Core**
Description	This course is to introduce students with an introduction to analysis and design of structure member with detailing and final drawing. The main aspects of project design is to aid students for design of vertical structures with respect to structural specification and codes
LEARNING OUTCOMES	After successfully completing this course, students will be able to: • Familiar with site plan, site design and architecture drawings • Learn structures loading calculations • Analysis of the structure by method of Kani • Learn design methods and design calculation • Familiar with detailing and drawings • Familiar with structure plans. Sections, and rebar drawings
Delivery Method	Lecture/ Seminar/problem solving /lab work
Difference between previous syllabus with the suggested syllabus with reasons	see weekly schedule
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Student Evaluation Procedures	Midterm Exam, Final Exam, Assignments, Quizzes, Seminars

0777 52 83 83 - 0799 52 83 83
info@kardan.edu.af
kardan.edu.af
fb.com/Kardan University
Parwan-e-Du Square, Kabul, Afghanistan