NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering in Civil

DEPARTMENTAL OUTCOME BASED EDUCATION (OBE) CATALOGUE

Batch 2025 and Onwards

18. Course Profiles

Course profiles of all the Engineering and Non-Engineering Courses as listed in the Scheme of Studies, are attached herewith.

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **PH-129 Applied Physics**	SEMESTER ☐SPRING ✓FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	DATE OF COURSE CONTENT APPROVAL July 2025	APPLIED FROM BATCH 2025

MAPPED SUSTAINABLE DEVELOPMENT GOALs (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Vectors & Mechanics: Review of vectors, Newton Laws and their Applications, Frictional Forces and determination of Co-efficient of Friction, Work-Energy Theorem, applications of law of Conservation of Energy, Angular Momentum, Centre of Mass.

Waves and Oscillations: Simple Harmonic Oscillator, Damped Harmonic Oscillation, Forced Oscillation and Resonance, Types of Waves and Superposition Principle

Optics and Lasers: Huygens Principle, Two-slit interference, Single-Slit Diffraction, Types of Lasers, Applications of Laser.

Modern Physics: Planck's explanations of Black Body Radiation Photoelectric Effect, De-Broglie Hypothesis, Electron Microscope, Atomic structure, X-rays, Radioactive Decay and Radioactive Dating, Radiation Detection Instruments

Electrostatics and Magnetism: Electric field due to different Charge Distribution, Electrostatic Potential Applications of Gauss's Law, Lorentz Force Ampere's Law, Magnetism, Magnetization, Magnetic Materials.

Electrical Elements and Circuits: Review of electric current, voltage, power, and energy, Ohm's law, inductance, capacitance, Basic Electrical circuits, Electromechanical systems.

Semiconductor Physics and Electronics: Energy levels in a Semiconductor, Hole concept, P-N junction, Diodes, Transistors, Basic Electronic circuits (e.g. rectifier).

Thermodynamics: Review of Laws of Thermodynamics, conduction, convection, and radiation. Thermal conductivity, specific heat, and overall heat transfer coefficients. Heating, Ventilation and Air Conditioning (HVAC).

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DISCUSS** principle of physics; and explain the concept of classical and modern physics to solve related problems	**C2**	Engineering Knowledge
2.	**USE** the concept of Classical Physics for engineering problems	**C3**	Problem Analysis
3.	**APPLY** the concept of Modern Physics to solve physical problems	**C3**	Problem Analysis

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____

(Chairperson/Date)

Approved by: _____

(Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
ES-127 Pakistan Studies (For Foreigners)	☐ SPRING ✓ FALL	TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOALs (SDG(s))

SDG 13 Climate Action
SDG 14 Life Below Water
SDG 15 Life on Land
SDG 16 Peace, Justice and Strong Institution

COURSE CONTENTS

Land of Pakistan: Land & People-Strategic importance- Important beautiful sights, Natural resources.
A Brief Historical Background: A brief Historical survey of Muslim community in the sub-continent, British rule & its impacts, Indian reaction, Two nation theory, Origin & development, Factors leading towards the demand of a separate Muslim state, Creation of Pakistan
Government & Politics in Pakistan: Constitution of Pakistan, A brief outline, Governmental structure, Federal & Provincial, Local Government Institutions, Political History, A brief account.
Pakistan & the Muslim World: Relations with the Muslim countries
Language and Culture: Origins of Urdu Language, Influence of Arabic & Persian on Urdu Language & Literature, A short history of Urdu literature

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** the historical, ideological, socio-economic, and political aspects of Pakistan as a nation and state.	**C2**	The Engineer and the world
2.	**DISCUSS** Pakistan's culture, issues, and challenges through appropriate actions and advocacy	**C2**	The Engineer and the world

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **ES-105 Pakistan Studies**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **June 21, 2023**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOALs (SDG(S))

SDG 13 Climate Action
SDG 14 Life Below Water
SDG 15 Life on Land
SDG 16 Peace, Justice and Strong Institution

COURSE CONTENTS

Historical and Ideological Perspective of Pakistan Movement: Two Nation Theory, Factors leading to the creation of Pakistan, Jinnah and demand for Pakistan.

Land of Pakistan: Geophysical conditions of Pakistan, Geopolitical and strategic importance of Pakistan, Natural resources of Pakistan: mineral, water and power resources.

Constitutional process: Early efforts to make a constitution (1947-1956), Salient features of the Constitution of 1956, 1962, Political and Constitutional crisis of 1971, Salient features of the Constitution of 1973, Constitutional amendments from 1973 to date.

Contemporary issues of Pakistan: A brief Survey of Pakistan's economy, The Current Economic Situation of Pakistan: Problems & Issues and future perspective, Social Issues: Pakistan's society and culture: broad features, Literacy and education in Pakistan: problems and issues, Scientific and technical development in Pakistan, Citizenship: national and international. Environmental Issues: Environmental pollution: causes, hazards and solutions, National policy, International treaties, conventions and protocols.

Pakistan's Foreign Policy: Pakistan's Foreign Policy from 1947 to present, Relations with immediate neighbors, Relations with major powers, Relations with the Muslim world.

Human Rights: Conceptual foundations, Western and Islamic perspective of Human Rights, Human Rights in the Constitution of 1973, Human rights issues in Pakistan.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** the historical and ideological foundations of the Pakistan Movement and assess its contemporary relevance in both regional and global contexts.	**C2**	The Engineer and the world
2.	**DISCUSS** key issues related to Pakistan's natural resources, economy, governance, and climate change, and propose viable solutions to address these challenges	**C2**	The Engineer and the world

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/02

Course Profile

COURSE CODE& TITLE **MT-116 Calculus & Analytical Geometry**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL**	**APPLIED FROM BATCH** **Fall 2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG 4: Quality Education: Core mathematics equips students with problem-solving and analytical skills, a backbone of higher education and lifelong learning.
SDG 9: Industry, Innovation, and Infrastructure: Calculus and geometry underpin engineering, technology, and innovation, which drive sustainable infrastructure.

COURSE CONTENTS

Set and Functions:

Define rational, irrational and real numbers; rounding off a numerical value to specified value to specified number of decimal places or significant figures; solving quadratic, and rational inequalities in involving modulus with graphical representation; Definition of set, set operations, Venn diagrams, De Morgan's laws, Cartesian product, Relation, Function and their types (Absolute value, greatest integer and combining functions). Graph of some well-known functions. Limit of functions and continuous and discontinuous functions with graphical representation.

Differential Calculus:

Differentiation and Successive differentiation and its application: Leibnitz theorem. Taylor and Maclaurin theorems with remainders in Cauchy and Lagrange form, power series. Taylor and Maclaurin series, L' Hopitals rule, extreme values of a function of one variable using first and second derivative test, asymptotes of a function, curvature and radius of curvature of a curve, partial differentiation, extreme values of a function of two variables with and without constraints. Solution of non-linear equation, using Newton Raphson method.

Integral Calculus:

Indefinite integrals and their computational techniques, reduction formulae, definite integrals and their convergence. Beta and Gamma functions and their identities, applications of integration relevant to the field.

Sequence & Series:

Sequence, Infinite Series, Application of convergence tests such as comparison, Root, Ratio, Raabe's and Gauss tests on the behaviour of series.

Analytical Geometry:

Review of vectors, scalars and vector products, Three-dimensional coordinate system and equation of straight line and plane and sphere, curve tracing of a function of two and three variables, surface revolutions, coordinate transformation.

Complex Number:

NED University of Engineering and Technology

Department of Mathematics

Programme Bachelor in Engineering/Sciences

Course Profile

F/QSP 11/17/02

Argand diagram, De Moivre formula, root of polynomial equations, curve and regions in the complex plane, standard functions and their inverses (exponential, circular and Hyperbolic functions).

COURSE LEARNING OUTCOMES (CLOs) WITH PROGRAMME LEARNING OUTCOMES (PLO) MAPPINGS

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**SOLVE** real and complex numbers problems.	**C3**	Problem Analysis
2.	**APPLY** calculus and analytical geometry to engineering problems.	**C3**	Problem Analysis
3.	**CARRY OUT** calculations to discuss the behavior of sequence and series.	**C3**	Problem Analysis

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **ES-206 Islamic Studies**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **15-05-2024**	**APPLIED FROM BATCH** **2024**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-5 Gender Equality
SDG-7 Affordable and Clean Energy
SDG-10 Reduced Inequalities
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Fundamentals of Islam: Tauheed, Arguments for the Oneness of God; **Al-Ambiya-22, Al-Baqarah-163-164,** Impact of Tauheed on human life, Place of Man in the Universe: **Al Israa/Bani Israil-70**; Purpose of creation: **Al zariyat-56,** Prophethood, Need for Prophet, Characteristics of Prophet, Finality of Prophethood: **Al-Imran-79, Al-Hashr-7, Al-Maidah-3,** and Faith in Hereafter (Aakhirat), Effects on worldly life: **Al-Hajj-5, Al-Baqarah-48, Hadith**
Ibadah: Concept of Ibadah, Major Ibadah, Salat, Zakat, Hajj and Jihad. **Al-Mu'minun-1-11, Al Anfaal- 60, & Two Ahadiths**
Basic Sources of Shariah: The Holy Quran, Its revelation and compilation, the authenticity of the Text, Hadith, Its need, Authenticity and Importance, Consensus (Ijmaa), Analogy (Qiyas)
Moral and Social Philosophy of Islam: The concept of Good and Evil; **A'l e Imran - 110, Al Nahl-125,** Akhlaq-e-Hasna with special reference to **Surah Al-Hujrat, verses 10, 11, 12, 13,** Professional Ethics (Kasb-e-Halal) **Al Taha-81, Al Baqar 188, one hadith.**
Seerat of the Holy Prophet(PBUH):
a) Moral and ethical teachings of the Holy Prophet (PBUH) with special reference to Hajjat-ul-Wida, (Fundamentals of Islam, Social aspects, Economics aspects, political aspects
b). Personal Characteristics: perseverance & trust in Allah, honesty & integrity, simplicity & humility, mercy & compassion, clemency & forgiveness, bravery & valor, generosity, patience.
c) Engagement and communication with collaborators and foes:
Cases Study from Seerah: Charter of Madina, Ghazwa e Khandaq, Treaty of Hudaibya , Ghazwa e Khayber, Najran's Delegation, Victory of Makkah.
d) Social values and rights, (peace & harmony, tolerance, solidarity, collaborations, inclusivity & cohesion)
Case Studies from Seerah: Al –Fudoul Confederacy, Placement of Black stone, charter of Medina, Treaty of Hudaibya)
Leadership skills (Vision, communication, negotiation, conflict management, decision making, relationship building, Integrity, positivity, compassion, empathy, loyalty, accountability, confidence, delegation, empowerment, problem- solving, foresightedness, openness, gratitude and justice).
Teaching of Holy Quran: Translation and tafseer of **Surah-e- Fatiha**, and The Selected Section of Sura Al-Furqan verses (63-77), Surah-**e-Luqman** (verses (12-19)).
Nazraah and Tajveed of: Suratul Fatiha, Ayatal Kursi, and last 10 surahs of the Holy Quran. (Ghunnah, Qalqalah, Al-Madd, Noon Sakinah & Tanween Rules)

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** the provided Quranic verses and Hadiths and their functional meaning and about the specified topics.	**C2**	Ethics
2.	**DESCRIBE** the foundational principles of Sariah sources and the exemplary characteristics of Seerat –un-Nabi (SAW) in personal and professional life.	**C2**	Ethics

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
ES-209 Ethical Behaviour (For Foreigners)	☐ SPRING ✓ FALL	TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-5 Gender Equality
SDG-7 Affordable and Clean Energy
SDG-10 Reduced Inequalities
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Nature, Scope and Methods of Ethics: Ethics and Religion, Ethical teachings of World Religions
Basic Moral Concepts: Right and Wrong, Good and Evil
Ethical Systems in Philosophy: Hedonism, Utilitarianism, Rationalism & Kant, Self-Realization Theories, Intuitionism
Islamic Moral Theory: Ethics of Qur'an and its Philosophical basis, Ethical precepts from Qur'an and Hadith and Promotion of Moral Values in Society.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** the ethical teachings of the world's major religions.	**C2**	Ethics
2.	**DESCRIBE** the importance and implications of ethics on individuals and societies.	**C2**	Ethics

REMARKS (if any):

Recommended by: _____ **Approved by:** _____

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE **CE-112 Engineering Drawing - I**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ☐3 ☐2 ✓1 ☐0 PR ☐3 ✓2 ☐1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SDGs

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Introduction: Use and care of Drawing Instruments, Standard Drawing Office Practice, Drawing types with respect to technicality and project execution

Conceptual Drawings and Projection system: Conceptual Drawings and Projections: Classification of projects (Perspective and parallel, Oblique, Axonometric projection, Orthographic projections), Sections

Architectural Plan, Elevation and Section: Architectural plan, elevation, section, site plan of a single and double-storey RCC house

Electrical, Plumbing, and HVAC Drawings: Building materials, Electric and Plumbing symbols and Abbreviations, Electrical, plumbing and HVAC of single and double storey RCC house

Computer Aided Drafting: Introduction to AutoCAD, General and basic know how related to computer aided drafting in AutoCAD, Basic draw commands, basic edit commands, Layers etc., AutoCAD applications for Civil engineering drawings.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**ILLUSTRATE** architectural aspects of civil engineering projects through drawings	**C3**	Communication
2.	**APPLY** basic engineering knowledge by manual drawing	**P1**	Engineering Knowledge
3.	**APPLY** computer-aided tools in engineering drawing	**P3**	Tool Usage

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-113 Engineering Mechanics**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Basic Properties: Concepts of space, time, mass, velocity, acceleration and force; scalar and vector quantities; Newton's law of motion; law of gravitation

System of Forces: Resultant and resolution of co-planar forces using parallelogram, triangle & polygon law and funicular polygon; Simple cases of resultant and resolution of forces in space; Conditions of equilibrium of co-planar forces, analytical and graphical; Formulations

Equilibrium of Rigid Bodies: Free body concept, conditions of support and attachment to other bodies; support reactions under different types of loading; Degree of restraints and static determinacy; Statically determinate problems specially of civil engineering importance; Equilibrium of two force and three-force bodies; Introduction to internal forces in plane trusses using method of joints and method of sections; Introduction to shear force and bending moment diagrams.

Kinematics: Work, energy and power; Virtual work formulation of equilibrium of co-planar force; Potential energy, energy criterion for equilibrium, Stability of equilibrium; Application to simple cases

Rigid Bodies: Geometrical properties of plane areas; First moment of area, centroid, second moment of area, principle axes; Polar moment of area and radius of gyration

Friction: Coulomb's theory of friction; Problem involving friction on flat and curved surfaces

Application of Principle of Dynamics: Rectilinear and curvilinear motion; Newton's equation of motion, dynamic equilibrium; Introduction to practical use of the above principle and properties.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**CARRY OUT** analysis for the two-dimensional force system and equilibrium	**C3**	Problem Analysis
2.	**CALCULATE** internal forces developed in structural members.	**C3**	Engineering Knowledge
3.	**PRACTICE** experiments to study various behaviour of forces	**P2**	Engineering Knowledge

REMARKS (if any):

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Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CY-100 Essentials of Chemistry**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-04 Quality Education

COURSE CONTENTS

Stoichiometry:
Significant figures, mole and Avogadro number, empirical and molecular formulas, stoichiometry yield (theoretical and practical)

Atomic Structure and Bonding:
Subatomic particles, Rutherford's and Bohr's atomic models, quantum numbers, electronic configuration, chemical bond, theories of covalent bond, shapes of molecules.

States of Matter:
Kinetic molecular theory, gas laws, liquid properties, types of solids, types of crystals

Acid, Base and Salt:
Theories of acids and bases, buffer solutions

Solutions and Colloids:
Properties and types of solutions, concentration units, colloids, and its classification

Electrical Conductance:
Redox reaction with balancing concept, electrode, electrode potential, and electrochemical series, corrosion

Organic Chemistry:
Organic compounds and their classification, homologous series, functional groups, nomenclature of organic Compounds.

Inorganic Chemistry:
Periodic classification of elements, periodic laws, group trends of various properties of s and p block elements, general characteristics of transition elements, IUPAC nomenclature of complexes.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** the classification, periodic behavior, and nomenclature of organic, inorganic, and coordination compounds	**C2**	Engineering Knowledge
2.	**EXPLAIN** concepts of general chemistry stoichiometry, atomic structure, bonding, states of matter, acid-base theories, solutions, redox reactions, and electrochemistry for theoretical and practical problems.	**C2**	Problem Analysis
3.	**OPERATE** the equipment with guidance to measure physical and chemical parameters	**P3**	Engineering Knowledge

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

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(Chairperson/Date)

Approved by: _____

(Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

F/QSP 11/17/02

Course Profile

COURSE CODE& TITLE **MT-221 Linear Algebra & Ordinary Differential**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL**	**APPLIED FROM BATCH 2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG 4: Quality Education: Builds core mathematical literacy and problem-solving capacity, essential for STEM education.

SDG 9: Industry, Innovation, and Infrastructure: Linear algebra (e.g., matrices, eigenvalues) and ODEs are the backbone of engineering systems, control theory, communication networks, and infrastructure modelling.

COURSE CONTENTS

Linear Algebra: Linearity and linear dependence of vectors, basis, dimension of a vector space, field matrix and type of matrices (singular, non- singular, symmetric, non- symmetric, upper, lower, diagonal), Rank of a matrix using row operations and special method, echelon and reduced echelon forms of a matrix, determination of consistency of a system of linear equation using rank, matrix of linear transformations, eigen value and eigen vectors of a matrix, Diagonalization. Applications of linear algebra in relevant engineering problem.

1st Order Differential Equations: Basic concept: Formation of differential equations and solution of differential equations by direct integration and by separating the variables: Homogeneous equations and equations reducible to homogeneous from; Linear differential equations of the order and equations reducible to the linear form; Bernoulli's equations and orthogonal trajectories: Application in relevant Engineering.

2nd and Higher Orders Equations: Special types of IInd order differential equations with constant coefficients and their solutions: The operator D; Inverse operator I/D; Solution of differential by operator D methods; Special cases, Cauchy's differential equations; Simultaneous differential equations; simple application of differential equations in relevant Engineering.

Partial Differential Equations: Basic concepts and formation of partial differential equations: Linear homogeneous partial differential equations and relations to ordinary differential equations: Solution of first order linear and special types of second and higher order differential equations; D' Alembert's solution of the wave equation and two dimensional wave equations: Lagrange's solution; Various standard forms.

Fourier Series: Periodic functions and expansion of periodic functions in Fourier series and Fourier coeffici Expansion of function with arbitrary periods. Odd and even functions and their Fourier series; Half range expan of Fourier series.

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/02

Course Profile

COURSE LEARNING OUTCOMES (CLOs) WITH PROGRAMME LEARNING OUTCOMES (PLO) MAPPINGS

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** formation of differential equations and system of linear equations to explain physical situations	**C2**	Engineering Knowledge
2.	**APPLY** appropriate methods to solve differential equations and system of linear equations of relevant engineering problems.	**C3**	Problem Analysis

REMARKS (if any):

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Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **EA-104 Functional English**	SEMESTER SPRING ✓ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL**	**APPLIED FROM BATCH**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-5 Gender Equality
SDG-10 Reduced Inequalities
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Objectives of the Course

The course aims at improving the four language skills –listening, speaking, reading and writing.
The functional aspect of language will be stressed further through development of students' vocabulary and use of grammar. Context based approach.

Course Contents

Speaking and Listening

- Listening actively through the use of skills and sub skills in a variety of situations.
- Speaking: Fluency and confidence building through group discussions, role plays and public speaking.
- Vocabulary development
- Tips / strategies in vocabulary enhancement
- Practice in vocabulary development

Reading

- Reading skills, Sub skills
- Reading strategies
- Reading practice through variety of reading texts and comprehension exercises
- Reading based tasks, task-based learning.

Writing

- Note taking: Techniques for taking notes from lectures, from books (integrated with listening & reading)
- Process of Writing with practice in pre writing strategies, in revising, and in, editing for grammar.
- Writing well- structured and effective paragraphs, essays and letters (routine communication) using proper writing mechanics. Writing memos, short reports, SOPs etc. and various other genres.
- Writing descriptions, narrations, cause and effect, compare and contrast etc.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DEMONSTRATE** effective presentation skills in academic settings.	**A3**	Communication
2.	**COMPREHEND** explicit and implicit information through reading and listening strategies.	**C2**	Communication
3.	**COMPOSE** drafts of various academic genres using writing processes and strategies.	**C6**	Communication

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

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(Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE **ES-108 Ideology and Constitution of Pakistan**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ☐0
PREREQUISITE COURSE(S) --	DATE OF COURSE CONTENT APPROVAL **2025**	APPLIED FROM BATCH **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG 4 Quality Education
SDG 5 Gender Equality
SDG 10 Reduced Inequalities
SDG 16 Peace, Justice and Strong Institution

COURSE CONTENTS

Two-Nation Theory: Nation and Nationalism in British India. Inclusive nationalism, Exclusive nationalism, Freedom movement in British India, Two-Nation Theory.

Ideology: definition and its significance: Difference between Philosophy, Ideology, and Theory. Evolution of Islamic ideology in British India. Pakistan movement: role of ideology. Ideological factors that shaped the Constitution(s) of Pakistan (Objectives Resolution 1949).

Introduction to the Constitution of Pakistan: Definition and importance of a constitution. First Constituent Assembly of Pakistan. Main issues that delayed the Constitution-making in Pakistan. Dissolution of the Constituent Assembly. Second Constituent Assembly of Pakistan. Third Constituent Assembly of Pakistan.

Constitution and State Structure: Federal form of State. Parliamentary form of government. Structure of Government (executive, legislature, and judiciary). Distribution of powers between federal and provincial governments.

Fundamental Rights, Principles of Policy, and Responsibilities: Duty of the citizens of Pakistan (Article 5). Overview of fundamental rights to citizens of Pakistan guaranteed by the Constitution 1973 (Articles 8-28). Overview of Principles of Policy (Articles 29-40).

Constitutional Amendments: Procedures for amending the Constitution. Notable constitutional amendments and their implications: 8th, 13th, 17th, and 18th

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** the historical evolution of Islamic ideology in British India and critically evaluate its influence on the freedom movement and the basic principles of the Constitution of Pakistan.	**C2**	The Engineer and the world
2.	**DISCUSS** the foundational concepts of the Constitution of Pakistan, including the structure of the state, system of governance, key institutions, fundamental rights, and civic responsibilities of citizens.	**C2**	The Engineer and the world

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CF-101 IT Fundamentals and Applications**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Fundamentals of IT: Introduction to Information and Communication Technologies (ICT), Components and scope of ICT, ICT productivity tools, Emerging technologies and future trends, Ethical Considerations in Use of ICT Platforms and Tools, Applications of ICT in education, healthcare and finance. Digital citizenship.

Data Representation and Number Systems: Binary, octal, decimal, hexadecimal systems, data representation: characters, numbers, multimedia.

Databases: Fundamentals of databases: organization and storage, introduction to Information Systems (IS) and Management Information Systems (MIS), real world IS and MIS applications.

Data Communication and Computer Networking: Network topologies, types of network

Programming Languages: Evolution and structures: syntax, semantics, special purpose vs. general-purpose languages, comparative study of data types, control structures and algorithms, basics of coding, practical problem solving.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** fundamental concepts in information technology and data management	**C2**	Engineering Knowledge
2.	**APPLY** programming constructs to solve complex problems using a modern high-level language	**C3***	Tool Usage
3.	**PRACTICE** the application of ICT tools and computer programming in a laboratory environment	**C3+**	Tool Usage

REMARKS (if any):

* Also to be assessed in lab work through software rubric in addition to theory.

+ Only to be assessed in lab work through software rubric.

Recommended by: _____ (Chairperson/Date)

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE **CE-114 Engineering Surveying - I**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-15 Life on Land

COURSE CONTENTS

Introduction: Introduction to land surveying, Definitions of basic surveying terms, branches and their application, Instruments used.

Survey Techniques: Distance measurement techniques, Compass survey, Traversing and triangulation, Plane table surveying, Computation of areas and volumes by various methods, Tacheometry, Theodolite survey.

Modern Methods in Surveying: Principles of EDM operation, EDM characteristics, Total stations, field procedures for total stations in topographic surveys, Construction layouts using total station. Introduction of Global Positioning System (GPS), Global Navigation Satellite Systems (GNSS), Light Detection and Ranging (LiDAR) and Laser Scanning.

Levelling and Contouring: Methods and types of levels, precise levelling, Methods and applications of contouring.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** basic surveying techniques used for surveying and leveling.	**C2**	Engineering Knowledge
2.	**PREPARE** maps and plans, contour maps, profiles, cross sections, etc. using surveying techniques.	**C3**	Problem Analysis
3.	**OPERATE** various survey equipment for measurements with required accuracy.	**P3**	Tool Usage

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-115 Engineering Materials**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-3 Good Health and Well-being
SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities

COURSE CONTENTS

Introduction to Engineering Materials: Classification of materials; Role and selection of materials in civil engineering.
Binding Materials: Manufacturing and constituents of Ordinary Portland Cement (OPC); Types and uses of cement; Properties and field/lab tests (e.g., setting time, fineness); Introduction and uses of lime.
Aggregates: Types and classification of fine and coarse aggregates; Mechanical and physical properties; Importance of grading and grading methods; Lab test introduction i.e., sieve analysis, impact value
Concrete: Basic mix design concept (by volume or ratio); Properties of fresh and hardened concrete; Common tests (slump, compaction factor)
Metals (Steel and Aluminum): Introduction to steel and aluminum; Physical and mechanical properties; Structural applications in civil engineering.
Bricks and Blocks: Manufacturing process; Types and classification; Physical properties and field identification; Applications in construction building.
Glass and Wood: Manufacturing methods; types and properties, Application in construction industry; Types, seasoning and preservation of wood
Bitumen and Asphalt: Types and sources; Properties and typical tests (penetration, ductility); Applications in pavement construction
Introduction to Modern Materials: Fibers; Paints; Plastic; and FRP.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** various properties of construction materials.	**C2**	Engineering Knowledge
2.	**APPLY** sustainable constructional materials for various uses.	**C3**	The Engineer and the World
3.	**INVESTIGATE** various material properties	**P3**	Investigation

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-224 Engineering Surveying - II	☐ SPRING ✓ FALL	TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) **CE-114 Engineering Surveying - I**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities
SDG-15 Life on Land

COURSE CONTENTS

Surveying Drafting and Computations: Introduction to Mapping and Computation, Maps and Plans, Plotting, Profiles, Cross- sections, Importance of Areas and Volumes, Uses of Different Formulae for Calculation of Areas and Volumes, Use of Surveying Software.

Highway and Railway Curves: Route surveys, Circular curves, Deflections and Chord calculations, Setting out circular curve by various methods, Compound curves, Reverse, Vertical, Parabolic curves, Computation of the high or low point on a vertical curve, Design considerations, Spiral curves, Spiral curve computations, Approximate solution for spiral problems, Superelevation.

Construction Surveys: Introduction, Horizontal and Vertical Control, Buildings, Rail Road, Pipelines and other Construction Surveys, Introduction to Tunnel and Underground surveys.

Hydrographic Surveys: General, Objectives of hydrographic Survey, Electronic Charting, Planning, Survey Vessels, Vertical Control, Depth and Tidal Measurements, Position-fixing Techniques, Sounding Plan, Horizontal Control, Processing and Presentation of Data.

Photogrammetry: Introduction, Aerial photogrammetry and its Applications, Flying Heights, Flight Planning, Relief Displacement, Photograph Overlap, Ground Control for Mapping, Mosaics, Stereoscopic Viewing and Parallax, Stereo Plotting Instruments, Analytical Plotters, Orth photos, Photogrammetric Mapping, use of modern instruments and techniques for mapping.

Control Surveys: General, Geodesy Universal Transverse Mercator Grid System, Modified Transverse Mercator Grid System, State Plane Coordinate Grid System, Lambert Projection, Computations for the Lambert Projection, Use of Grid Coordinates, Computation Technique for Azimuth.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped (PLO)
At the end of the course, the student will be able to:			
1.	**CARRY OUT** computations used in Engineering Surveying.	**C3**	Problem Analysis
2.	**CARRYOUT** different types of surveying and their applications.	**C3**	Engineering Knowledge
3.	**PRACTICE** layout and mapping.	**P3**	Tool Usage

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-225 Mechanics of Solids - I**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) **CE-113 Engineering Mechanics**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Different Stress States: Uniaxial state of stresses and strains, Relationships between elastic Constants, Response of materials under uniaxial static loading, Normal and shearing stress and strains, Distribution of direct stresses on uniform and non-uniform members, Thermal stresses and strains

Bending Theory: Theory of simple bending, position of neutral axis, moment of resistance and section modulus, Bending and shearing stress distribution in beams, Relationship between load, shear force and bending moment, Stresses in composite sections.

Slope and Deflection: Curvature, slope and deflection of beams using integration methods

Theory of Torsion: Theory of torsion of solids and hollow circular shafts, shearing stress distribution, angle of twist, strength and stiffness of shaft.

Biaxial state of stress: Biaxial state of stresses, resolution of stresses, Principal plane, principal stresses and strains, Graphical representation of stress and strains, Mohr's circle of stresses and strains.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**CARRYOUT** computation for stresses and strains under different loading conditions.	**C3**	Problem Analysis
2.	**SOLVE** problems related to biaxial state of stresses.	**C3**	Problem Analysis
3.	**PRACTICE** experiments to study the material response under different sets of loadings.	**P2**	Engineering Knowledge

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-226 Geology for Civil Engineers**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-13 Climate Action

COURSE CONTENTS

Introduction to Engineering Geology*:* Definition, scope, and relevance of geology in civil engineering. Rock cycle and overview of geological processes.
Earth Materials: Minerals and Rocks: Common rock-forming minerals (e.g., quartz, feldspar, mica), rock classification, identification and demonstration (igneous, sedimentary, metamorphic), and engineering properties of rocks.
Geological Structures and Mapping: Folds, faults, joints, unconformities. Use of geological maps and cross sections in engineering. Introduction to stereonets and dip/strike analysis.
Geologic Hazards: Earthquakes (seismic waves, plate tectonics, seismic zoning of Pakistan), landslides (types, causes, mitigation), ground subsidence.
Applied Geology in Civil Engineering: Engineering relevance of geology to dams, tunnels, slopes, roads, and foundations. Rock mass classification (RMR/Q), site investigation basics.
Basic Hydrogeology: Groundwater occurrence, aquifers, springs, water table, wells, permeability and flow in soil/rock.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**IDENTIFY** various rocks and minerals.	**C3**	Lifelong learning
2.	**DESCRIBE** application of geology in civil engineering projects.	**C3**	Engineering Knowledge

REMARKS (if any):

Recommended by: _____ **Approved by:** _____

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-110 Chemistry for Civil Engineers**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ☐3 ☐2 ✓1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-6 Clean Water and Sanitation
SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Electrochemistry: Laws of Electrolysis, E.M.F. series, corrosion (Theories, inhibition & protection)
Cement & aggregates: Chemical composition, Hydration, Structure of hydrated cement, Influence of the compound composition on properties of cement, Alkali- silica reaction in aggregates, Alkali- carbonate reaction, Tests for aggregate reactivity
Durability of Concrete: Diffusion and absorption, Carbonation, Acid attack on concrete, Sulfate attack on concrete, Effects of sea water on concrete
Water-related chemistry: pH, Chloride, TDS, Hardness
Soil-related Chemistry: Chemical formation of soils, pH, organic content, salt content, Mica content

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** basic aspects related to durability of concrete	**C2**	Engineering Knowledge
2.	**INVESTIGATE** durability properties related to concrete with environmental consideration	**P2**	The Engineer and the world

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-228 Engineering Drawing - II	✓ SPRING ☐ FALL	TH ☐3 ☐2 ✓1 ☐0 PR ☐3 ✓2 ☐1 ☐0
PREREQUISITE COURSE(S) **CE-112 Engineering Drawing - I**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Structural Drawings: Elements of structural drawing and detailing, preparation of foundation plan, structural framing, slab details, staircase details, water tanks, beam and column elevations and sections mostly pertaining to reinforced concrete structures.
Structural Details of Steel Roof Truss: Details of steel roof truss, connection details and fabrication drawings
Drawings and Detailing of Hydraulic and Drainage Structures: Broad prospective about hydraulic and drainage structural details, Layout plan, Sectional details
Drawings and Detailing of Highway and Motor way: Broad prospective about highway and motorway structural details, Layout plan, Sectional details
Introduction to Building Information Modeling (BIM): Different functions of BIM tools, e.g. REVIT etc., 2D and 3D drawings, Architectural drawings in REVIT

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**ILLUSTRATE** use of BIM tools.	**C3**	Tool Usage
2.	**ILLUSTRATE** structural aspects of civil engineering projects through drawings.	**C3**	Engineering Knowledge
3.	**APPLY** of computers aided tools in engineering drawing.	**P3**	Tool Usage

REMARKS (if any):

Recommended by: _____ **Approved by:** _____

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-229 Structural Analysis - I**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) **CE-113 Engineering Mechanics**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Introduction: Introduction of Structural forms, two-dimensional pin connected and flexural forms, three-dimensional pin connected and flexural forms. Idealization for analysis and design.

External Loads: Techniques of evaluation of estimated external loads, Dead, Live, Wind and Earthquake loads, Use of codes in estimating different types of external Static and Moving loads and Load combinations.

Determinacy of Structure: Determinate and indeterminate structures, Static and kinematics determinacy, Compatibility and boundary conditions: Structural safety, small deflection theory.

Evaluation of Deformation Using Geometric Methods: Principal of superposition, Moment area method and Conjugate beam method.

Evaluation of Deformation Using Energy Principals: Unit load method, Principal of real work, Principal of virtual work: Castigliano's theorems.

Arches and Suspension Structures: Analysis of Statically Determinate Arches, Introduction to suspension type structures.

Influence Line for Moving Loads: Concept and Evaluation of Influence Lines for Support Reactions, Internal Shear force and Bending Moments in Statically Determinate Beams.

Introduction to modelling & simulation tools: for structural analysis of statically determinate beams and frames.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DEFINE** load types, structural safety, stress and deformation.	**C1**	Engineering Knowledge
2.	**DESCRIBE** determinacy of structures, compatibility, boundary conditions etc.	**C2**	Engineering Knowledge
3.	**ANALYSE** forces and deformations in structural components like beams, trusses, arches etc.	**C4**	Problem Analysis

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-230 Fluid Mechanics - I**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-5 Gender Equality
SDG-9 Industrial Innovation and Infrastructure
SDG-10 Reduced Inequalities
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Basic Concepts and Definitions: Units, Density, specific weight, mass, viscosity etc.
Fluid statics: Pascal's Law, Measurement of pressure, Pressure head, Manometers, Hydrostatics forces on submerged areas (vertical, inclined and curved), Buoyancy of fluids.
Fluid Kinematics: Types of flow, Streamline and streak lines, Velocity and acceleration in steady & unsteady flow, Continuum, Lagrange and Eulerian description, Equation of continuity, mass flow rate, weight flow rate.
Energy Consideration in Steady Flow: Concept of Energy and head, General equations of energy and Bernoulli's assumption for incompressible fluids, Hydraulic grade line and energy line, power consideration, cavitation
Impulse-Momentum: Basic principle, Force on pressure conduits, reducers and bends, jet of water, Structure in open channel.
Hydraulic scale models and similitude: Overview of similitude and dimensional analysis, models and prototype, scaling, problems for application. Geometric, Kinematic and Dynamic similarities, dimensionless numbers, Buckingham-Pi Theorem.
Fluid Properties Measurements: Fluid properties, Hydrostatic Pressure, velocity measurements, Orifices meter, free and forced vortex, venture meter, notches & weirs.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** the basic concepts and principles of fluid mechanics	**C2**	Engineering Knowledge
2.	**APPLYING** the basic fluid principles in general engineering problem	**C3**	Problem Analysis
3.	**OBSERVE** basic fluid properties and flow types	**P1**	Engineering Knowledge
4.	**VALUES** contribution in group assignments (i.e. Complex Engineering Activities)	**A3**	Individual and Collaborative Teamwork

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
MT-331 Probability & Statistics	✓ SPRING ☐ FALL	TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG 4: Quality Education: Builds quantitative literacy, data analysis, and critical thinking skills.
SDG 9: Industry, Innovation & Infrastructure: Statistics underpins research, innovation, industrial optimization, and technological development.
SDG 17: Partnerships for the Goals: Data collection, monitoring, and statistical analysis are explicitly mentioned in SDG 17 targets as essential for tracking progress.

COURSE CONTENTS

Statistics: Introduction, Types of data & variables, presentation to data, object, classifications, Tabulation, Frequency distribution, Graphical representation, Simple & Multiple Bar diagrams, Pie-Diagram, Histogram, Frequency Polygon, Frequency Curves & their types.

Measures Of Central Tendency And Dispersion: Statistics Averages, Median Mode, Quartiles, Range, Moments, Skew ness & Kurtosis, Quartile Deviation, Mean Deviation, Standard Deviation, Variance & its coefficient, Practical Significance in related problems.

Curve Fitting: Introduction, fitting of a first and second degree curve, fitting of exponential and logarithmic curves, related problems. Principle of least squares, Second order Statistics & Time series not in bit detail.

Simple Regression & Correlation: Introduction, Scatter diagrams, Correlation & its Coefficient, Regression lines, Rank Correlation & its Coefficient, Probable Error (P.E), Related problems.

Sampling And Sampling Distribution: Introduction, Population, Parameter & Statistic, Objects of sampling, Sampling distribution of Mean, Standard errors, Sampling & Non-Sampling Errors, Random Sampling, Sampling with & without replacement, Sequential Sampling, Central limit theorem with practical significance in related problems.

Statistical Inference And Testing Of Hypothesis: Introduction, Estimation, Types of Estimates, Confidence interval, Tests of Hypothesis, Chi-Square distribution/test, one tails & two tails tests. Application in related problems.

Probability: Basic concepts, Permutation & Combination, Definitions of probability, Laws of probability. Conditional probability, Bayes' rule. Related problems in practical significance.

Random Variables: Introduction, Discrete & Continuous random variables, Random Sequences and transformations. Probability distribution, Probability density function, Distribution function, Mathematical expectations, Moment Generating Function (M.G.F.), Markov random walks chain/ Related problems.

Probability Distributions: Introduction, Discrete probability distributions, Binomial Poisson, Hyper geometric & Negative binomial distributions. Continuous probability distribution, Uniform, Exponential & Normal distributions & their practical significance.

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DISCUSS** the fundamental concepts in Probability and Statistics	**C2**	Engineering Knowledge
2.	**ANALYZE** data to produce mathematical or probabilistic models in relevant engineering problems.	**C4**	Problem Analysis

REMARKS (if any):

Recommended by: _____

(Chairperson/Date)

Approved by: _____

(Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **MG-228 Sociology and Development**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-5 Gender Equality
SDG-9 Industrial Innovation and Infrastructure
SDG-10 Reduced Inequalities
SDG-11 Sustainable Cities and Communities
SDG-13 Climate Action
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Introduction to Sociology: Importance and scope, study of social life, exploring the global village, Sociology as a science, relationship with other social sciences, the sociological imagination, development of sociology, pioneers of sociology, Brief historical development of sociology, Society and community, Social interaction processes. Social groups & Social Institutions: Definition, functions and types of social groups, Structure and function of social institutions.

Culture and Related Concepts: Definition, Types and Elements of Culture, Role of Culture in Organization, Socialization and Personality.

Social Stratification: Factors of Social Stratification, Approach to study Social Stratification, Power, Prestige, and Authority Social mobility, migration.

Social and cultural change: Definition and dynamics of social change, Impact of globalization on society and culture, Resistance to change.

Sociology of Development: Significant sociological questions, Measures of inequality and development, Modernization theory and explanation of underdevelopment, Education, Industrialization & development.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DISCUSS** key concepts and theoretical perspectives of sociology*	**C2**	The Engineer and the world
2.	**EVALUATE** contemporary social and developmental issues in purview of sustainable practices*	**C4**	Ethics
3.	**EXPRESS** ideas and Plans for socioeconomic changes in society*	**A3**	Lifelong learning
* This CLO's assessment is mapped for PLO level attainment by the individual student as well.			

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CF-202 Applied Economics for Engineers	✓ SPRING ☐ FALL	TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-4 Quality Education
SDG-8 Decent Work and Economic Growth
SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities

COURSE CONTENTS

Introduction: Basic Concepts and principles of Economics, Micro-economics theory, the problems of scarcity, Basic concept of Engineering Economy

Economic Environment: Consumer and Producer goods, Goods and services, Demand and supply concept, Equilibrium, Elasticity of demand, Elasticity of supply, Measures of Economic worth, Price-supply-demand-relationship

Elementary Financial Analysis: Basic accounting equation, Development and interpretation of financial statements-Income Statement Balance Sheet and Cash flow, Working capital management

Break Even Analysis: Revenue/cost terminologies, Behaviour of Costs, Determination of Costs/Revenues, Numerical and graphical presentations, Practical applications, BEA as a management tool for achieving financial/operational efficiency

Selections Between Alternatives: Time value of money and financial rate of return, Present value, Future value and Annuities, Cost-benefit anlaysis, Selection amongst materials, techniques, designs etc. investment philosophy, Investment alternatives having identical lives, Alternatives having different lives, Make of buy decisions and replacement decisions

Value Analysis/ Value Engineering: Value analysis procedures, Value engineering procedures, Value analysis versus value engineering, Advantages and application in different areas, Value analysis in designing and purchasing

Linear Programming: Mathematical statement of linear programming problems, Graphic solution Simplex procedure, Duality problem

Depreciation and Taxes: Depreciation concept. Economic life, Methods of depreciation, Profit and returns on capital, productivity of capital, Gain (loss) on the disposal of an asset, depreciation as a tax shield

Business Organization & Industrial Relationship: (a) Type of ownership, single ownership, partnerships, corporation, type of stocks and joint stock companies, Banking and specialized credit institutions (b) Labour problems, Labour organizations, Prevention and settlement of disputes

Capital Financing and Allocation: Capital Budgeting, Allocation of capital among independent projects, financing with debt capital, Financing with equity capital, Trading on equity, Financial leveraging.

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DISCUSS** significance of economic analysis in engineering profession.	**C2**	The Engineer and the World
2.	**ANALYZE** alternatives using economic analysis techniques to accomplish a given objective.	**C4**	Problem Analysis

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-441 Professional Ethics in Construction Industry**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

COURSE CONTENTS

Fundamentals of Professional Ethics in Construction Industry: Being professional and ethical, Professional Ethics vs. Law, Professional Ethics for construction/ civil engineering organizations and connected Professionals.
Ethical Dilemmas and Decision Making: Methods for ethical decision making, Ethical Dilemmas and Related Decisions, Conflicts of interest and managing risk.
Dealing with Ethical Issues in Construction Industry: Dealing with Ethical Dilemmas in various Project Life Cycle phases: feasibility; planning; design; procurement; construction (including quality, safety, supervision, methods, etc.) & facilities management, Codes of Professional Ethics for Civil Engineers and their Compliance, Case Studies of Ethical Dilemmas and Good Practices in the Built Environment.
Broader Application of Professional Ethics in Construction Industry: Ethical leadership in construction industry, Professional Ethics in the Global Context of Built Environment, Emerging Topics in Professional Ethics in Construction Industry.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	--	--	--
2.	--	--	--
3.	--	--	--

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-241 Engineer and Society**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-4 Quality Education
SDG-5 Gender Equality
SDG-8 Decent Work and Economic Growth
SDG-9 Industrial Innovation and Infrastructure
SDG-10 Reduced Inequalities
SDG-13 Climate Action
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Societal Needs and Development: Understanding Societal Needs, contextual knowledge to Assess Societal Issues, Aligning engineering knowledge to develop solutions for relevant societal issues, Sustainable Development, Sustainable Communities, Societal Resilience, Community Leadership.

Assessment and Role: Using Contextual Knowledge to Assess Societal Health, Safety, Legal and Cultural Issues, Responsibilities to relevant engineering practice for solution of open-ended problems, Role of Engineers for civic sense, Engineers as Community Leaders, Role of engineers in policy making.

Professional Engineering Practice for Societal Improvement: Ethical Behaviour in Community, Ethical Decision Making, Dealing with Ethical Dilemmas, Understanding the impacts and taking responsibility of engineering decisions, Understanding and Dealing with Corruption, Aligning engineering decisions with national policies, Occupational Health and Safety.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** needs the development considering professional engineering practice for societal improvement *	**C2**	The Engineer and The World
2.	**ANALYSE** lifelong role of engineer for societal needs and development *	**C4**	Lifelong Learning
3.	**VALUE** ethical behaviour in the practice of engineering *	**A3**	Ethics
* This CLO's assessment is mapped for PLO level attainment by the individual student as well.			

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE **CF-201 Civics & Community Engagement**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	DATE OF COURSE CONTENT APPROVAL **July 2025**	APPLIED FROM BATCH **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities
SDG-12 Responsible Consumption and Production
SDG-13 Climate Action
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Introduction to Civics and Citizenship: Definition of civics, citizenship and civic engagement, Historical evolution of civics participation, Types of citizenship: active, participatory, digital etc. The relationships between democracy and citizenship

Civics and Citizenship: Concepts of civics, citizenship and civic engagement, Foundation of modern society and citizenship. Types of citizenship: active, participatory, digital etc.

State, Government and Civil Society: Structure and functions of government in Pakistan, The relationships between democracy and civil society, Right to vote and importance of political participation and representation

Rights and Responsibilities: Overview of fundamental rights and liberties of citizens under constitution of Pakistan 1973, Civic responsibilities and duties, Ethical considerations in civic engagement (accountability, non-violence, peaceful dialogue, civility, etc.)

Community Engagement: Concept, nature and characteristics of community, Community development and social cohesion, Approaches to effective community Engagement, case studies of successful community driven initiatives

Advocacy and Activism: Public discourse and public opinion, role of advocacy in addressing social issues, Social action movements

Digital Citizenship and Technology: The use of digital platforms for civic engagement, Cyber ethics and responsible use of social media, Digital divides and disparities (access, usage, socioeconomic, geographic etc.) and their impact on citizenship

Diversity, Inclusion and Social Justice: Understanding diversity in society (ethnic, cultural, economic, political etc.), Youth, women and minorities' engagement in social development, Addressing social inequalities and injustice in Pakistan, Promoting inclusive citizenship and equal rights for societal harmony and peaceful co-existence

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** the concepts of civics and community engagement for individuals and groups recognizing civil rights, responsibilities, ethics and diversity for a better society.	**C2**	The Engineer and the World
2.	**RECOGNIZE** the importance of diversity and inclusivity for long-term societal harmony and peaceful co-existence	**A3**	Lifelong Learning

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CF-200 Community Service**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ☐2 ☐1 ✓0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities
SDG-12 Responsible Consumption and Production
SDG-13 Climate Action
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Orientation to Community Service: [Taught component]
Introduction to the concept and practice of community service. Need, objectives and benefits of community service. Foundational theories (educational, undergraduate curriculum, humanities, social science, corporate social responsibility etc.). Tools and skills needed in community service. Contextual examples in community service; case examples. Professional and ethical conduct during community service

Community Service Attachment
Completing 30-35 hours of formal assignment at an organization

Community Service Experience Documentation
Writing a report documenting the experience and submitting it on the prescribed format.

NOTE: Total contact hour for theory (thought component 8 + documentation activity 6) will be 14 hours.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPRESS** an interest in contributing to the community and society individually and collectively through social projects	**A3**	The Engineer and the World
2.	**VOLUNTEER** to help make a difference to a specific group, community, or organization	**A2**	Lifelong Learning

REMARKS (if any):

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-324 Reinforced Concrete Design - I	☐ SPRING ✓ FALL	TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities
SDG-12 Responsible Consumption and Production

COURSE CONTENTS

Constituent Materials & Properties: Overview of the Properties of hardened cement concrete and Steel (e.g. Stress-strain behaviour, modulus of elasticity, etc.)

Basic Principles of Reinforced Concrete: Basic principles of reinforced concrete design and associated assumptions, Behavior of reinforced concrete members in flexure, Design philosophy, design codes, factor of safety and load factors, Prevailing methods of analysis and design of reinforced concrete members, Working Stress Method, Ultimate Strength Method).

Beam Analysis and Design: Flexure analysis and design of beams (singly, doubly, rectangular section, T/L sections, simple span, one end and both end continuous), Shear analysis and design of beams, Design detailing

Serviceability in RC Beams: Working stress method of analysis for serviceability, Check for deflection, crack width and spacing,

Slab Analysis and Design for Gravity Loading: One-way solid and ribbed slabs, Two-way solid slabs using coefficient method, General discussion on other slab systems, Design of staircase, Design detailing

Columns: Analysis of sections in pure compression, Design of short columns under pure compression and with eccentric loading, Design detailing,

Footings: Isolated footings, Structural design of simple rectangular footing. Design detailing

Steel Detailing (Bond, Anchorage & Development Length): Design and detailing for bond, anchorage, development length, laps and splices

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** the basic material behavior of reinforced concrete and mechanical properties of constituents.	**C2**	Engineering Knowledge
2.	**APPLY** theories and models suitable for the analysis and design of RC members.	**C3**	Engineering Knowledge
3.	**DESIGN** RC members under different loading conditions.	**C4**	Design and Development of Solutions

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-341 Transportation Engineering - I**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) **CE-224 Engineering Surveying - II**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities

COURSE CONTENTS

Transportation Planning: Modes of transport, Development of various modes in Pakistan, Role of highways within a Transport System, Highway classification, Highway planning and economic appraisal, Network planning, origin and destination studies.
Highway Engineering: Geometric design including cross section elements, Highway materials. tests and construction practices, Flexible and rigid pavement design, Highway drainage, Highway maintenance.
Traffic Engineering: Traffic flow characteristics, Traffic studies, Capacity analysis and Traffic control devices.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** basic concepts of planning, design and operational aspects of transportation.	**C2**	Engineering Knowledge
2.	**ILLUSTRATE** geometric and structural design aspects of highways.	**C3**	Design and Development of Solutions
3.	**PRACTICE** experiments on highway construction material properties.	**P3**	Engineering Knowledge

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE **CE-329 Construction Engineering**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

SDG-12 Responsible Consumption and Production

COURSE CONTENTS

Introduction: Construction Projects, Project Life Cycle Phases, Key Players, Project Success Parameters, Normal Tracking and Fast Tracking, Project Categories, Building Permits; Codes and Regulations, Construction Standards, Sustainability.

Construction Equipment: Types of Equipment used specifically in Building Construction, Analysis of Capital, Operating; Investment; Maintenance; Repair Costs, Equipment Productivity and Cost Effectiveness.

Overview: Overview of construction industry, Road works, retaining walls and dams construction, Stability failures and protection, Dewatering, Pile foundation, Earth moving materials and operations, Excavating and lifting equipment's, Loading and hauling equipment's, Construction equipment's economics, Site layout overview and examples, Foundations and its types, Concrete construction, Masonry Construction, Construction joints, Finishing.

Layout Techniques: Site Selection and Orientation of Buildings, Grading Considerations, Layout techniques with special reference to buildings.

Excavation: Excavation in deferent types of soils, stability of excavation and solution of particular problems arising out of condition of sub-soil at site e.g. de-watering, shoring and bracing, sheet piling etc.

Placement of Concrete: Methods of preparation pouring, placement and curing of concrete in foundations. Construction joints in raft foundations, mass concreting, Plinth joints in raft foundations, mass concreting, Plinth beams and plinth protection, damp proof course.

Construction Methodologies: In-Situ and Pre-Cast Concrete Construction of Buildings, Slab on Grade, Plain Cement Concrete Floors, Planar and Non-Planar Roofing Systems. Doors, Windows, Masonry, Brickwork, Glazing, Cladding, Façade, Curtain Wall, Floor Finishing, Interior and Exterior Building Finishes, and Water Proofing. Protection of adjacent Structures. Mechanized construction. Design and use of formwork for various building units/members. Methods of Concreting Vertical and Horizontal Members, including Mechanized Placement, Ready Mix Concrete etc. Construction Joints, Mass concreting, Plinth Beams and Plinth Protection. Planar and Non-Planar Construction Aspects related to Services.

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DEMONSTRATE** understanding of constructional aspects related to public infrastructure projects.	**C3**	Engineering Knowledge
2.	**ANALYZE** the heavy construction equipment and operations for key project planning and management inputs.	**C4**	Project Management and Finance
3.	**APPLY** knowledge regarding building construction methodologies.	**C3**	Engineering Knowledge

REMARKS (if any):

Recommended by: _____

(Chairperson/Date)

Approved by: _____

(Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE **CE-342 Fluid Mechanics - II**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) **CE-230 Fluid Mechanics - I**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-6 Clean Water and Sanitation
SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Steady Flow through Pressure Conduits: General equation for friction, Laminar and turbulent flow, Reynold's Number, Velocity profile in circular pipes, Nukurade's experiment- viscous sub layer; smooth, transition and fully rough pipe concepts and equations & Moody's Diagram, Minor losses, simple pipe-networks-Hardy cross method.
Steady Flow in Open Channel: General equation for friction for open channel, Uniform flow equations (Chezy and Manning), Most Efficient sections, Specific energy, Subcritical, critical and supercritical flow, Froude Number, Non rectangular sections.
Pumps: Types- Centrifugal, Axial flow, reciprocating, rotary, impellers, radial, axial, mixed flow, Specify speed, operating point of pumps, NPSH, pump characteristic curves.
Turbines/Hydro Power Engineering: Types, reaction and impulse-turbines, Momentum equation applied to turbines, Specify speed, Turbine characteristic, Components of Hydro Electric plants.
Ideal flow theory: Continuity, rotationality, potentials, flow fields, streamlines, flow nets.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** pressurized conduit flow, open channel flow, unsteady flow, physical model using principles of similitude, and basic principles of hydraulic machinery.	**C2**	Engineering Knowledge
2.	**ANALYZE** the pipe/pipe network, open channel hydraulic for steady state flow.	**C4**	Problem Analysis
3.	**SET** instruments for type of flow, characteristics of pumps and turbines.	**P2**	Investigation

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
MT-443 Numerical Analysis	☐ SPRING ✓ FALL	TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG 4: Quality Education
SDG 9: Industry, Innovation & Infrastructure

COURSE CONTENTS

Error Analysis: Types of errors (relative, Absolute, inherent, round off, truncation), significant digits and numerical instability, flow chart. Use any computational tools to analysis the numerical solutions.
Finite Difference: Functions of operators, difference operators and the derivative operators, identities. Linear homogeneous and non-homogeneous difference equations. Numerical Differentiation, Forward Difference Method, Backward Difference Method, Central Difference Method.
Solution of Non-linear Equation: Numerical methods for finding the roots of transcendental and polynomial equations (Secant, Newton – Raphson Chebyshev and Graeffe's root squaring methods), rate of convergence and stability of an iterative method. Fixed point Iteration, Bisection Method, Non-linear systems of equations, application to consolidation, settlement and seepage analysis.
Solution of Linear Equation: Numerical methods for finding the solutions of system of linear equations (Gauss-Elimination, Gauss-Jordan Elimination, Triangularization, Cholesky, Jacobi and Gauss – Seidel). Applications to structural analysis and water distribution network problems.
Interpolation & Curve Fitting: Lagrange's, Newton, Hermit, Spline, least squares approximation. (Linear and non-linear curves).
Numerical Integration & Differentiation: Computation of integrals using simple Trapezoidal rule, 1 *th* Simpson's 3 rule, 3/8 *th* Simpson's rule. Composite Simpson's and Trapezoidal rules, computation of solutions of differential equations using (Euler method, Euler modified method, Runge Kutta method of order 4)

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** numerical method to solve system of linear equations and non-linear equation	**C2**	Engineering Knowledge
2.	**APPLY** numerical method to solve system of linear equation and non-linear equations in relevant	**C3**	Problem Analysis
3.	**APPLY** numerical differentiation and numerical integration in relevant engineering problem.	**C3**	Problem Analysis

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-327 Soil Mechanics - I**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities
SDG-15 Life on Land

COURSE CONTENTS

Introduction to Soil Mechanics and Nature of Soils: Origin, formation, types of soil deposits, structure and mineralogy of soils, clay minerals, soil fabric.

Phase Relationships and Physical Properties: Water content, void ratio, porosity, unit weights, air voids, saturation, specific gravity, phase diagram, numerical exercises.

Index Properties and classification systems of Soils: Particle size & shape, sieve & hydrometer analysis, Atterberg limits (LL, PL, SL), plasticity index, liquidity index, activity, sensitivity of clays, consistency charts. Unified Soil Classification System (USCS), AASHTO, Textural classification system, group symbols, descriptive terms.

Permeability and Seepage: Darcy's law, permeability testing (falling/constant head), factors affecting permeability, flow nets, seepage force, capillary rise, quicksand conditions.

In-Situ Stresses in Soils: Total, effective, neutral stress; effects of seepage (upward/downward), Boussinesq's theory, Newmark charts.

Shear Strength of Soils: Mohr-Coulomb theory, direct shear, triaxial, unconfined compression, vane shear tests; role of strain rate, drainage conditions; stress-strain behavior.

Consolidation of Soils: 1D consolidation theory, oedometer test, compression index, coefficient of consolidation, time factor, preconsolidation pressure, secondary compression.

Soil Compaction: Principles, Standard/Modified Proctor tests, moisture-density relationship, field compaction, in-situ density, factors affecting compaction.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**CARRY OUT** classification of soils.	**C3**	Engineering Knowledge
2.	**ANALYSE** soil mass for stress, seepage and settlement	**C4**	Problem Analysis
3.	**PRACTICE** laboratory and field tests to characterize various soil parameters	**P3**	Investigation

REMARKS (if any):

Recommended by: _____ **Approved by:** _____

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-331 Quantity and Cost Estimation	✓ SPRING ☐ FALL	TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) **CE-228 Engineering Drawing - II**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-5 Gender Equality
SDG-9 Industrial Innovation and Infrastructure
SDG-10 Reduced Inequalities
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

General: Scope of civil engineering works, General practice in industry or schedule of rates and specifications, Rates analysis, Procedure and Application to Concrete, Description of Schedule of Values, Specifications for various items in construction.

Estimating Basics: Concept, Need and Significance, Estimate Categories and Project Life Cycle (PLC), Role of Estimates in PLC, Estimate Types, Estimate Accuracy vs Time, Scheduling the Estimating Process, Estimating Data Needs; Sources; and Data Collection Approaches, Estimating Considerations, Estimating Procedure, Computerized Estimating Overview.

Developing Preliminary Estimates: Development Process and Illustrative Examples of Conceptual and Assemblies Estimates.

Quantity Takeoff Basics: Process, Measurement Units, Takeoff Rules, Measurement Accuracy, Organization of Takeoff, Overview of Takeoff by Computer, Review of Estimate Math.

Pricing Basics: Pricing Parameters, Pricing Sources, Contractor's Risk of Pricing Low or High, Direct and Indirect Cost, Labor Productivity, Overview of the Process and Considerations of Pricing; Labor; Equipment; Materials; Subcontracted Work; and General Conditions.

Definitive Estimates: Working out quantities, rates and costing analysis of construction works

Bill Processing: General principle, Contents and preparation of bills of quantities for a project and maintaining of Measurement Books.

Estimating Worked Examples: Quantity Takeoff and Pricing of Labor, Material and Equipment for; Sitework, Concrete, Masonry, Carpentry, and Finishes Works; Overview and Discussion of Estimating Procedures and Considerations for Concrete Retaining Wall, Piles, Steel Truss, Road, Sewer and Water Mains Pipe Works.

Further Estimating Concerns: Estimate Setup, Overhead, Profit, Sources of Estimating Errors, Escalation, Contingency, Life-Cycle Costing.

Use of Estimating Software/ Spreadsheets

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**APPLY** concept and skills for quantity take-off for different civil engineering works.	**C3**	Engineering Knowledge
2.	**CARRY OUT** rate analysis, productivity and pricing.	**C3**	Problem Analysis
3.	**DISCUSS** concepts related to legal and contractual aspects of cost of construction projects.	**C2**	Project Management and Finance
4.	**VALUES** contribution in group assignments (i.e. Complex Engineering Activities)	**A3**	Individual and Collaborative Teamwork

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-325 Structural Analysis - II	✓ SPRING ☐ FALL	TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) **CE-229 Structural Analysis - I**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Analysis of Indeterminate Structures Using Force Approach: Compatibility methods for beams and frames.
Analysis of Indeterminate Structures using Displacement Approach: Moment distribution for beams and frames for prismatic and non-prismatic members with and without side-sway and support settlement, Slope deflection method for beams and frames with and without support settlement.
Matrix Methods: Introduction to Stiffness and Flexibility methods, Determination of stiffness matrix for Truss and beam elements, Development of structure stiffness matrix, Shear Force and Bending moment diagrams for statically indeterminate beams and frames, Application of suitable Computer Software for analysis of statically Indeterminate beams and frames.
Introduction to Finite Element Method: Introduction to finite elements, Stiffness matrices for bar elements, Transformation matrices, Structure stiffness matrix**.**
Introduction to modelling & simulation tools: for structural analysis of statically indeterminate beams and frames.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**ANALYZE** Statistically Indeterminate Structures using Classical Methods	**C4**	Problem Analysis
2.	**ANALYZE** statistically indeterminate structures using matrix method.	**C4**	Problem Analysis

REMARKS (if any):

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-326 Mechanics of Solids - II**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) **CE-225 Mechanics of Solids - I**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Enhanced Topics Related to Beam Bending and Shear: Unsymmetrical bending, shear flow, shear center, Analysis of curved beams

Theory of Elasticity: Analysis of stresses and strains due to combined effect of axial, bending and twisting forces/moments, Elementary theory of elasticity, equilibrium and compatibility equations, stress and deformation relationships, Stress transformation, polar co-ordinates, Theories of failure.

Torsion of Thin Tubes and Open Sections: Torsion of non-circular shafts, membrane analogy, Torsion in thin tubes and open sections.

Cylinders: Analysis of thin and thick-walled cylinders.

Theory of Plasticity: Elementary theory of plasticity, plastic hinges, shape factor and failure mechanism.

Stability: Struts and columns, Euler, Rankine and other formulas for buckling load of columns, Stability analysis of columns under eccentric loading.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**ANALYZE** beams subjected to unsymmetrical bending, curved beams and beams on elastic foundations.	**C4**	Problem Analysis
2.	**APPLY** of theory of elasticity under generalized loading.	**C3**	Problem Analysis
3.	**DISCUSS** theory of plasticity and plastic analysis of beams and frames.	**C2**	Problem Analysis

REMARKS (if any):

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-330 Essentials in Construction Project Management	✓ SPRING ☐ FALL	TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Introduction: The Construction Industry, Nature and Challenges, Key Industry Support Organizations, Public and Private Works, Past; Present; Opportunities; and Threats with Specific Reference to Pakistani Construction Industry.

Project Management in the Engineering & Construction Industry: PM knowledge areas: PM Life Cycle processes; Organizational structure of a construction project; Responsibilities of client, Key PM Skills; Key Roles and Responsibilities of Client, Consultants - including architects, engineers and allied professionals, constructors, PM and CM; Professional construction management; Project Management issues and need for improved organization and management structures and processes with particular reference to local construction industry

Project Scoping, Bidding and Preconstruction Planning: Determining Relative Priorities of Key Project Objectives; Defining Project Scope, Types of tenders / contracts; Pre-Qualification process, Bidding process, Bid Package, Overview of Preconstruction Planning Aspects Including Area and Site Investigation; Preliminary schedules; Value Engineering; Constructability Analysis; Work packages; Drawings and Specifications review.

Project Planning, and Scheduling by Deterministic Planning and Methods: Scheduling Overview; Planning and Scheduling Process; Work Breakdown Structure; Planning and Scheduling Activities; Bar/ Gant Charts; ADM & PDM Networks; CPM project scheduling using PDM; Time Constrained Scheduling.

Project Planning, Scheduling by Probabilistic Methods: Uncertainty Sources; Limitations of Deterministic CPM; PERT scheduling; PERT advantages and limitations; PERT today in construction industry.

Resource and Cost Considerations in Project and Planning & Scheduling: Resource planning and scheduling; Resource Productivity; Resource levelling; Resource curves and profiles; Direct cost versus indirect cost; ; Contingency profit; Cost Accrual Patterns; Time cost trade off; Least cost expediting; Project cost accounting; Cash flow and S-Curve;

Project Monitoring and Control: Project Monitoring System, Project Control Process, Time; Cost; and Work Performance Measurement and Evaluation, Percent Complete, Look Ahead Schedules; Earned Value Cost and Schedule Control System

Site Organization: Contractor's Site (Team) Organization Chart, Overview of Site Management issues. Use of Computer Software in Planning and Management for Construction Projects.

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**UNDERSTAND** project management knowledge areas and processes.	**C2**	Project Management and Finance
2.	**ANALYZE** project networks with different techniques like CPM and PERT.	**C4**	Problem Analysis
3.	**APPLY** resource planning to develop resources loading diagram and profiles.	**C3**	Problem Analysis

REMARKS (if any):

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-328 Introduction to Entrepreneurship & Opportunity Assessment	✓ SPRING ☐ FALL	TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-5 Gender Equality
SDG-8 Decent Work and Economic Growth
SDG-9 Industrial Innovation and Infrastructure
SDG-10 Reduced Inequalities
SDG-13 Climate Action
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Introduction to Entrepreneurial Process: Definition and Philosophy; Need and Significance of Innovation and Entrepreneurship; Role within the Economy; Social Implications; Entrepreneurs as Role Models; Past and Future of Entrepreneurship; Overview of the Entrepreneurial Management Process; Idea Generation; Opportunity Evaluation; Making a Strategy; Gathering Resources; Launching the Business; Growing the Business; Harvesting Returns, Entrepreneurship in different contexts; Social (donating profits, "doing good", non-profit); Organizational (start-ups, corporate, public sector**)**

Introduction to Innovation: What is Innovation?, Innovations in Organizations, Decision Making and Strategy, Sources of Innovation, Fostering Innovation and Entrepreneurship.

Entrepreneurial Traits: Entrepreneurial Mind-Set; Entrepreneurial Strategy; Personal Potential for Entrepreneurship; Career Paths for Entrepreneurs

From Idea to Market – An Overview: Research and Invention, Introduction to Technology Transfer; Background; Technology Transfer Cycle; Pitfalls in Commercialization, Invention Evaluation and Assessment; Review of Inventions – Novelty and Utility; Understanding your Invention, Intellectual Property Basics – Patent; Copyright; Trademark, Assessing Licensing/ New Business Opportunities, Technology Development, Technology Marketing; Product and Market Assessment; Marketing Strategy; Targeting Companies, Technology Licensing; Valuation; Licensing Agreements; Negotiation; Technology Assessment Report.

Entrepreneurial Assessment: Identifying the Purpose of the Proposed Business; Developing and Communicating the Business Idea; Identifying and Analyzing the Potential Business Market; Delineating a Product or Service; Evaluation of Expected and Requisite Revenue Generation.

Legal Considerations and Liabilities: Intellectual Property; Legal Issues in Establishing an Organization; Patents; Trademarks; Licensing; Product Safety and Liability; Insurance and Contracts.

Business Canvas Model: Introduction to Business Canvas Model, Nine building blocks of modelling, Key Partners, Key Partners, Key resources, Cost Structure, Value Proposition, Customer Relationship, Customer segment, Channels, and Revenue Streams

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** the role of entrepreneurship in the development of society *	**C2**	The Engineer and The World
2.	**VALUE** business ethics on entrepreneurial activities	**A3**	Ethics
3.	**DEMONSTRATE** the entrepreneurial skills to develop a business plan *	**C3**	Lifelong Learning
*This CLO's assessment is mapped for PLO level attainment by the individual student as well.			

REMARKS (if any):

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE **CE-461 Soil Mechanics - II**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) **CE-327 Soil Mechanics - I**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-15 Life on Land

COURSE CONTENTS

Subsoil Investigation: Purpose and planning of site exploration, soil sampling (disturbed/undisturbed), boring methods (auger, rotary), in-situ tests (introduction to SPT, CPT), borehole log preparation.

Bearing Capacity of Shallow Foundations: Basic definitions (gross, net, ultimate, safe bearing capacities), failure modes, Terzaghi's and Meyerhof's bearing capacity equations, water table effects, design of isolated and strip foundations. Brief discussion of *Plate load test and field estimation.*

Lateral Earth Pressure: At-rest, active, and passive pressures, Rankine and Coulomb's theories (dry conditions), simple earth pressure diagrams.

Settlement Analysis: Immediate and consolidation settlements, concept of total and differential settlement, allowable limits, overview of primary and secondary consolidation, graphical interpretation (e–log p), use of compression index (Cc).

Slope Stability Analysis: Infinite slope stability, Swedish circle method, Bishop's simplified method (only concept and equation introduction), Taylor's stability number.

Soil Property Modification: Objectives and need for improvement, mechanical compaction, lime/cement stabilization, basic idea of stone columns and geosynthetics.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**ANALYZE** earth pressures, bearing capacity and stability of slopes	**C4**	Problem Analysis
2.	**ANALYZE** different soil strata for settlement	**C4**	Problem Analysis
3.	**PRACTICE** laboratory and field tests as required for subsoil investigation.	**P3**	Investigation

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-454 Hydraulics and Water Resources Engineering - I	☐ SPRING ✓ FALL	TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) **CE-230 Fluid Mechanics – I**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-6 Clean Water and Sanitation
SDG-9 Industrial Innovation and Infrastructure
SDG-14 Life Below Water

COURSE CONTENTS

Introduction to Water Resources Engineering: Hydrological cycle; Overview, Rain, Surface and sub-surface water hydrology, and water resource estimates
Open Channels and Sediment Transport: Erosion and Sediment yield; Design of open channels - Kennedy's and Lacey's theories
Surface Water Hydrology: Rainfall – Local Rainfall, spatially – Averaged Rainfall, Design Rainfall Interception, Evapotranspiration, Depression storage, Infiltration Rainfall – Runoff Analysis-Runoff Models; Time of Concentration, Peak- Runoff Models.
Irrigation: Irrigation, Indus Basin Irrigation System (Indus water treaty; water apportionment accord etc.), Soil – water-plant relationship, Irrigation methods (Pressurized and non-pressurized).
Subsurface hydrology/ Drainage: Unsaturated and saturated subsurface water and its movement- Darcy's Equation, Water wells and its construction. Waterlogging and Salinity, Surface &subsurface drainage and its methods.
Dams and Barrages: Types, components, and function of barrages and Dams, Reservoirs.
Water Quality and Lake Dynamics: Water quality background, Important Concepts, Best Management Practices, Biological Impaired Water.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** hydrology, hydraulics, irrigation and drainage concepts.	**C2**	Engineering Knowledge
2.	**ANALYSE** the water resource system for water-use and water control	**C4**	Problem Analysis
3.	**PRACTICE** measuring basic parameters of hydrology and hydraulic processes	**P3**	Investigation

REMARKS (if any):

Recommended by: _____ **Approved by:** _____

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-455 Reinforced Concrete Design - II**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) **CE-324 Reinforced Concrete Design - I**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities

COURSE CONTENTS

Design for Torsion: Torsion in reinforced concrete members. Analysis and design of reinforced concrete members under combined torsion and shear stress.

Flat Slab, Flat Plate & Waffle Slab: Analysis and design of flat plate, flat slabs and waffle slabs for flexure and shear under gravity loading.

Slender Columns: Analysis and design of slender columns subjected to combined flexure and axial loading

Design of Different Types of Foundations: Analysis and design of eccentric, strap, combined, footings and pile caps.

Prestressing Principles & Design Philosophy: Principles of prestressing, properties of high strength materials used in prestressing, Importance of high strength concrete and steel used in prestressing, Behavioral aspects of prestressed beams and comparison with reinforced concrete beams, comparison with reinforced concrete beams, post tensioning and pre- tensioning techniques, comparison and hard-ware requirements.

Prestress Losses: Prestress losses, immediate and time dependent losses, lump sum and detailed estimation of prestress loss.

Analysis and Design: Simply supported prestressed concrete beams.

Introduction to computer aided analysis and design.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESIGN** of RC elements of superstructure	**C6**	Design and Development of Solutions
2.	**DESIGN** of foundations substructure elements	**C6**	Design and Development of Solutions
3.	**DESIGN** of prestressed concrete members	**C6**	Design and Development of Solutions

REMARKS (if any):

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Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **EN-406 Environmental Engineering**	SEMESTER ☐ SPRING ✓ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-6 Clean Water and Sanitation
SDG-9 Industrial Innovation and Infrastructure
SDG-12 Responsible Consumption and Production
SDG-13 Climate Action
SDG-14 Life Below Water
SDG-15 Life on Land

COURSE CONTENTS

Introduction: Components of environment, Ecosystem, Human population and urbanization, Water supply and sanitary engineering, Global environmental issues

Environmental Chemistry and Biology: Chemical processes for environmental engineering, Kinetics, Oxygen demand: biochemical, chemical, and theoretical, Microbial degradation

Environmental Pollution: Sources and effects of air and water contaminants, municipal and industrial waste, noise pollution

Environmental Quality Standards: Purpose of standards, Types and components of standards, Legal frameworks (local and international)

Environmental Measurements: Calculate chemical concentration, Measuring GHG emissions, pollution load and toxicity

Pollution Control Measures: Application of fundamental control principles to issues in Water and Wastewater quality, Air quality, Noise and vibration, Solid and hazardous waste management

Water Demand & Supply: Population Forecast, Water Uses & Consumption, Types and Variations in Demand, Maximum Demand & Fire Demand, Urban & Rural Water Supply

Introduction to Environmental Impact Assessment: Environmental Impact Assessment Requirement, Implication and Significance

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** Environmental pollution	**C2**	Environment and Sustainability
2.	**APPLICATION** of engineering principles to control pollution	**C3**	The Engineer and the World
3.	**DETECT** concentration of pollutants in environmental samples	**P1**	Investigation

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-456 Design of Steel Structures**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ✓3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities

COURSE CONTENTS

Introduction: Use of steel as a structural material, Mechanical properties, Types and shapes of structural steel members, Specifications and design codes, Design philosophies, load and safety factors

Fundamentals of Allowable Stress Design Method: Overview of Allowable Stress Design (ASD), Service load and allowable stresses

LRFD Method of Design: Factor of safety, loads and load combination, Concept of load and resistance factors

Axially Loaded Members: Analysis and design of tension members, Analysis and design of Compression Members, Concept of Stability, Local and overall buckling, Euler's buckling load in columns, Slenderness and Effective Length

Analysis and design of beams: Classification of beams based on local and overall buckling; Flexural strength of laterally supported and unsupported beams. Shear strength, Serviceability, Biaxial Bending, Purlins, Roof framing systems

Members subjected to combined load effects: Axial-flexural interaction, Second order effects, Moment magnification

Plate girder proportioning and design.

Connections: Analysis and Design of simple welded and bolted connections, Overview of moment and shear connections

Use of computational tools for analysis and design of framed steel structures.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** the theories and models suitable for the analysis and design of structural steel members.	**C2**	Engineering Knowledge
2.	**DESIGN** structural steel members under axial loads, flexure and shear.	**C6**	Design and Development of Solutions
3.	**DESIGN** connections in structural steel members.	**C6**	Design and Development of Solutions

REMARKS (if any):

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Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-432 Transportation Engineering - II	✓ SPRING ☐ FALL	TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) **CE-341 Transportation Engineering - I**	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Railway Engineering: Types of rail systems, Railway organization in Pakistan, Railway alignment and grades, Cross sectional elements of railway tracks, Pointers and crossings, stations and yards, Railway signaling systems, Laying of tracks and maintenance of railway right-of-way, Creep and anti-creep devices, Various types of railway locomotives, Methods of traction, Track resistances.

Coastal Engineering: Classification of harbours, Ports and harbours of Pakistan, Design principles and requirements of harbours, Effect of wind, waves and tides on design, Wharves and jetties, Breakwaters and groynes, Channel regulation and demarkation, Classification of docks and their construction, Transit sheds and warehouses.

Airport Engineering: Component of air transportation, Airport activity, Aircraft characteristics affecting airport airside, Airport site selection, Airside configuration, Navigation aids, Airport lighting and marking, Distribution concepts of terminal buildings, Geometric design of airside, Structural design of airfield pavements.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DEMONSTRATE** understanding of railway engineering	**C3**	Engineering Knowledge
2.	**DESCRIBE** key elements of port and harbors and their design principles.	**C2**	Engineering knowledge
3.	**OUTLINE** key element of air transportation systems	**C4**	Problem Analysis

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-443 Structural Design & Drawing**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities

COURSE CONTENTS

Design and Detailing of Buildings for Wind & Earth Quake: Analysis and design of multi-storied reinforced concrete buildings including effects of wind and earthquake through utilization of structural analyses and design software, and manual calculations.
Tanks & Reservoirs: Analysis and design of underground, overhead tanks and reservoirs. Analysis and design of retaining walls (e.g. cantilever, etc.)

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**UNDERSTAND** gravity and seismic design	**C2**	Engineering Knowledge
2.	**ANALYSE** design of structural framing system of building	**C4**	Problem Analysis
3.	**DESIGN** structural components of building	**C4**	Design/Development of solution

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-450 Commute and Mass Transit**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

COURSE CONTENTS

Introduction: Commute, types of commute, characteristics of commute & master plan of urban area, Evolution and role of urban public transportation modes; systems, and services focusing on bus and rail, mass rapid transit in Pakistan-context, technological characteristics and their impacts on capacity; service quality; and cost.
Planning and Design: Practices and new methods for data collection and analysis, performance monitoring, route design, frequency determination.
Management: Organizational models for delivering public transportation service including transit operations, selected transit management and environmental implications.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	--	--	--
2.	--	--	--
3.	--	--	--

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-448 Coastal and Harbour Engineering**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities
SDG-13 Climate Action
SDG-14 Life Below Water

COURSE CONTENTS

Introduction to Coastal Engineering: Linear wave theory
Tides and Water level: Physics of Tides, prediction of tidal variations and appreciate the impact of tides in the coastal environment; tidal power;
Coastal Processes: Surf zone processes: cross shore and longshore currents; sediment transport; beach response and profiles; shoreline erosion/ Bluff erosion.
Coastal Management: Coastal land and water use; pollution control; defence techniques (headlands, breakwaters, groynes, rip-rap, nourishment, sea walls, retreat); wave-structure interaction.
Harbour Engineering: Design principles and requirements of harbours, effects of waves and tides on design, Wharves and jetties, Channel regulation and demarcation, Classification of docks and their construction, Transit Sheds and warehouses.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**LIST** features and components of Harbour and Ports	**C1**	Engineering Knowledge
2.	**EXPLAIN** various coastal and hydraulic process including tides	**C2**	Engineering Knowledge
3.	**ILLUSTRATE** design principles and requirement of harbours including coastal management strategies	**C3**	Design/ Development of Solutions
4.	**SOLVE** problems related to short and long term wave statistics	**C3**	Lifelong Learning

REMARKS (if any):

Recommended by: _____ **Approved by:** _____

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-449 Hydraulics and Water Resource Engineering - II	✓ SPRING ☐ FALL	TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-6 Clean Water and Sanitation
SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Hydrology: Weather Systems, Precipitation Analysis, Intensity-Duration-Frequency curve, Stream flow, Unit and Synthetic Hydrograph Analysis
Sediment Engineering: Weathering, Erosion and Sediment Processes, Factors Affecting Erosion, Sediment Yield e.g., RUSLE, Sediment Transport processes, Erosion and Pollution, Vegetate Waterways
Irrigation & Drainage: Crop Water Requirement/Soil-Water-Plant Relationship; Irrigation Strategies, Irrigation System Designs Subsurface, Drainage Design; Occurrence of Groundwater, Well Hydraulics (Theim and Theis Equations).
Hydrological Analyses: Probability concept, Annual Maxima, Flow Duration Curve, Risk and Reliability
Hydrologic Simulation Models: Introduction and steps to Watershed Modelling, Application of Hydrologic Models

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** advanced hydrology, hydraulics, irrigation and drainage concepts	**C2**	Engineering Knowledge
2.	**ANALYSE** hydrological and water quality parameters	**C4**	Problem Analysis
3.	**APPLY** the best management practices (BMPs) for sustainable eco-systems	**C3**	The Engineer and The World

REMARKS (if any):

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-447 Geoinformatics Applications**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ☐2 ✓1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-15 Life on Land

COURSE CONTENTS

Introduction to Geo Informatics and Resources of Information: photogrammetric surveying, Satellite System, Aerial and Satellite photogrammetry
Geographic Information System (GIS): Fundamentals of GIS, Spatial Data types and acquiring consideration, Data models and structures, Coordinate System, Datum and map projection and their transformation, Attribute-based operation, Introduction to Spatial Analysis
Remote Sensing (RS): Basic Concepts, Physicals basis of Remote Sensing, Earth Resources Satellites / Platforms, Sensors, Types of Resolutions, Geo-referencing, Image Processing Techniques and Classification, Global Positioning System (GPS), Navigational Satellites, Positioning Systems (GLONASS, GPS & Galileo), Fundamentals and Elements of GPS, System Operation & Characteristics, Errors and Atmospheric effects, Differential GPS (DGPS)
Legal implication Pakistan: Ethical and National responsibilities during the development & sharing of spatial database, of GIS in Mapping & Surveying Act 2014

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** earth projections and coordinates/referencing systems.	**C2**	Engineering Knowledge
2.	**APPLY** spatial analysis in construction engineering	**C3**	Problem Analysis
3.	**APPLY** GIS software for mapping, data exchange and analysis in construction engineering	**C3 +**	Tool Usage
+ Only to be assessed in lab work through software rubric.			

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-446 Geosynthetics and their applications**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities

COURSE CONTENTS

Introduction to Geosynthetics: Definition, classification (geotextiles, geogrids, geomembranes, GCLs, geonets, geocells), overview of raw materials and manufacturing, general properties and common applications.
Functions of Geosynthetics: Separation, filtration, drainage, barrier (containment), reinforcement, protection, combined functions, function-performance design thinking
Soil–Geosynthetic Interaction: Load transfer, shear strength at interface, pullout behavior, influencing factors.
Applications of Geosynthetics: Roadways and railways, retaining structures, landfill liners and covers, erosion control, drainage, slope and embankment reinforcement.
Durability and Quality Assurance (New): Long-term performance, UV resistance, chemical/biological degradation, quality control & field inspection practices.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DISCUSS** the properties and testing procedures of geosynthetics	**C2**	Engineering Knowledge
2.	**USE** appropriate geosynthetic materials for various civil engineering application.	**C3**	Problem Analysis

REMARKS (if any):

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Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE **CE-445 Building Information Modelling**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ☐2 ✓1 ☐0 PR ☐3 ☐2 ✓1 ☐0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-5 Gender Equality
SDG-9 Industrial Innovation and Infrastructure
SDG-10 Reduced Inequalities
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

BIM Fundamentals: BIM Overview; BIM vs. Traditional CAD; Common BIM Terminology; Value of BIM; BIM as a Communication and Collaboration Tool; BIM Benefits; Typical BIM Process; BIM Implementation Needs and Challenges.

BIM Technology: Phased Structure of a BIM project; Classes of BIM Tools; Common BIM Applications; Planning and Organizing the Use of BIM Tools; Embedding BIM Tools into Processes; Identifying and Selecting BIM Tools.

Application of BIM: Developing an Architectural Model; Walls; Slabs; Roofs; Ceilings; Floor

Technology on a Real Time: Coverings and Wall Coverings; Doors and Windows; Speciality Items,

Project of Challenging Scope: Developing a Structural Model; Foundations; Columns; Beams/Slabs; Roof Systems; Trusses, Developing an MEP Model; HVAC only, Developing a Site Plan, Developing Project Schedule (4D), Develop understanding of how BIM models are integrated with schedules, Developing Templates for Estimating (5D), Performing Energy Analysis, Develop understanding of how BIM models are applicable to the Energy Analysis, Construction Management and Facilities Management; Develop understanding of how BIM models are applicable to the Construction Management and Facilities Management processes, Performing Walkthroughs/ Flythroughs/ Animation, Presentation Issues/ Rendering, Following software may be used; Revit Architecture, Revit Structure, Revit MEP, Tekla, Constructor, Estimator, Control, Navisworks, EcoTect, etc.

Discussion on BIM Benefits: Stakeholder and Site Coordination, Sustainable Design and Construction,

Using Real Time Project: Construction Detailing, Pre-Construction Tasks such as Analyzing Constructability, Cost Estimation, Scheduling, Clash Detection, Materials and Methods, Site Safety Improvement, Quality Assurance, Documentation of the Construction Process, Integration of Design and Construction Models, Facilities Management, Improved Trade Coordination, More Accurate Quantity Surveying, Change Management, Risk Analysis, Energy Analysis, etc.

Further Aspects: Process Change from BIM Use, BIM as an Underlying Enabler of Effective Team Communication.

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**IDENTIFY** BIM application in the project management domain	**C1**	Project Management and Finance
2.	**APPLY** BIM on a real-life project with a challenging scope	**C3***	Individual and Collaborative Teamwork
3.	**OPERATE** under supervision the pre-requisite software platforms for BIM	**P3 +**	Tool Usage
* Also to be assessed in lab work through PBL rubric in addition to theory in the lab work. + Only to be assessed in lab work through software rubric.			

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-442 Applied Hydraulics	✓ SPRING ☐ FALL	TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-14 Life Below Water

COURSE CONTENTS

Design of Conveyance Infrastructure: Canal, outlets, regulating structures, Flumes, Chutes, Siphons, Culverts, Energy Dissipation structures, Canal lining

Forces on Immersed bodies: Simple Lift and drag equations and their applications, Introduction to boundary layers, approximate solutions, Lift and drag over a flat plate, Application to simple problems

Hydrodynamics: Recap ideal flow theory, Viscous Flow, Stress-Deformation Relationships, The Navier-Stokes Equations.

Unsteady Flow: Surges in pipes and open channel, discharge with varying heads, water hammer and Surge chamber.

Hydropower Engineering: selection of hydropower sites, operation and regulation of storage reservoir

Advanced Topics in Hydraulics: Hydraulic Simulations Models and Computational Fluid Dynamics

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** advanced hydraulic concepts and hydraulic structures	**C2**	Engineering Knowledge
2.	**ANALYSE** of hydraulic structures numerically	**C4**	Problem Analysis
3.	**APPLY** the operating principles of general hydraulics in order to repair, maintain, install, and consider variety of fluid systems	**C4**	Problem Analysis

REMARKS (if any):

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NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-444 Masonry Structures**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities

COURSE CONTENTS

Loadbearing masonry Buildings: Advantages and development of loadbearing masonry, basic design considerations, Structural safety; limit state design, foundations, unreinforced and reinforced masonry, design methods, load combinations

Masonry Materials and Properties: Blocks, mortar, sand, water, proportioning and strength, choice of unit and mortar, wall ties, concrete infill and grout, Compressive strength, strength of masonry in combined compression and shear, tensile strength of masonry, modulus of elasticity, effects of workmanship on masonry strength, thermal effects, creep, shrinkage

Design of Unreinforced Masonry for Gravity and Lateral loads: Wall and column behaviour under axial load, Wall and column behaviour under eccentric load, slenderness ration, calculation of eccentricity, vertical load resistance, modification factors, distribution and analysis for lateral forces.

Design of Reinforced Masonry for Gravity and Lateral loads: Axial strength, flexural strength and shear strength of reinforced masonry, deflection of reinforced masonry beams, reinforced masonry columns. design of masonry shear walls for gravity and lateral loads, Use of Appropriate computing tools / software to analyze adequacy of masonry sections under combined axial loads and bending moments.

Anchorage to Masonry: Type of anchor bolts, placement and embedment of anchor bolts in masonry grout, nominal strength of anchor bolts under axial tension or shear or in combined axial tension and shear both.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**DESCRIBE** the materials used in loadbearing masonry structures	**C2**	Engineering Knowledge
2.	**DESIGN** of reinforced and pre-stressed masonries using different loading conditions	**C4**	Design/Development of Solutions

REMARKS (if any):

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Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CN-442 Disaster and Reconstruction Management**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities
SDG-12 Responsible Consumption and Production

COURSE CONTENTS

Monitoring of Infrastructure facilities; strategies for protection against possible damages; maintenance for different infrastructure facilities. Rehabilitation and repair strategies for reinforced concrete, repair and rehabilitation of pipe networks; sewers; roads and drainage facilities, Predications and preparedness strategies for natural disasters such as Earthquakes etc; Emergency management; Awareness Programs; Follow-on Disasters; Recovery plans; Strategies for protection; Loss estimation; Risk and Vulnerability Analysis; Disaster Mitigation.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** concepts of disaster management and its theories	**C2**	Engineering Knowledge
2.	**APPLY** knowledge of disaster prevention and mitigation to manage disaster	**C3**	Project Management and Finance
3.	**ANALYSE** disaster related information for planning and reconstruction process.	**C4**	Problem Analysis

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CN-441 Environmental Issues in Construction	✓ SPRING ☐ FALL	TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities
SDG-13 Climate Action

COURSE CONTENTS

Environment: Definition, Climatic factors, soil-air-water relationship.
Environmental Pollution: Sources, Pollutants, Effects and remediation of air, water, land, noise and radiation pollution, Toxic/hazardous wastes, Wastes related to construction activities.
Environmental Impact Assessment: Requirement, Implication and significance, International; Federal and Provincial EPA Standards, Bye-laws and legislation, EIA of big and small projects as per National and International guidelines.
Water Demand & Supply: Population forecast, Water uses & consumption, Types & variations in demand, Maximum demand & fire demand, Urban & rural water supply, Technology.
Water Quality and Treatment: Water impurities & their health significance, Water quality standards, (U.S. & WHO, Pakistan etc.), Water quality monitoring, Various methods of treatment of surface & ground waters including screening, sedimentation, coagulation, filtration, disinfection and water softening methods, Emergency treatment methods.
Sewage and Sewerage Systems: Wastewater types, Separate and combined sewer systems, Types, sizes and materials of sewers, Sewer appurtenances, pipe strength and tests.
Building Water Supply and Drainage: Layout of water supply arrangement, Fixtures and their installation, Tapping of water mains, Requirements and arrangement of building drainage, Soil pipes, Antisyphon pipes and waste water pipes, Sanitary fixtures and traps.
Construction Waste Disposal: Types, characteristics and sources of construction wastes, Collection disposal and recycling.
Energy Conservation: Effective utilization and management of energy services in construction activities, Green building concepts.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** the built Environment and Water Supply, Sewerage, and Drainage systems	**C2**	Engineering Knowledge
2.	**CARRY OUT** environmental impact Assessments for the built structures and services	**C3**	The Engineer and The World
3.	**OUTLINE** management and conservation methods	**C3**	The Engineer and The World

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-453 Construction Contract Management**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-12 Responsible Consumption and Production
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Introduction to Contracts: General Description, Construction Contracts, Elements, Format and Major Components, Key Drafting Considerations.

Contract Award Mechanisms

General Considerations in Bids for Public Projects, Overview of PPRA Bidding Rules, Responsible and Responsive Bidder, Lowest Cost Bidding, General Considerations in Bids for Private Projects, Bid Bonds.

The Bidding Process: Bid Advertisement, Prequalification, Bid Package, Accuracy of Bidding Information, Instructions to Bidders, Addenda, Modification and Withdrawal of Bids, Award, Mistakes in Bids.

Subcontractors & Subcontracts: Subcontractor Bidding and Selection Process, Bid Shopping, Advantages and Disadvantages. of Subcontracting, Insurance and Bonding Requirements, Subcontract Agreement and Terms, Subcontract Management.

Contract Conditions: General and Supplementary Conditions of Contract, Overview and Discussion on Use of Standard Contracts in Construction – PEC, AIA, FIDIC, etc.

Contract Specifications: Relationship with Drawings; Types; CSI Divisions; Basic Writing Principles; Division 01 – General Requirements, Sample Specifications from other CSI Divisions.

Contract Interpretations and Modifications: Interpreting Contract Documents, Common Rules of Contract Interpretation, Contract Modifications.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**UNDERSTAND** procurement process, construction contracts and contractual risks associated with various project delivery/contract mechanism.	**C2**	Project Management and Finance
2.	**ANALYSE** conditions of contract and Interpreting contracts for resolution of ambiguities, conflicts, claims and disputes *	**C4**	Project Management and Finance
3.	**UNDERSTAND** the legal context of construction and techniques of alternate dispute resolution	**C2**	The Engineer and The World
* This CLO's assessment is mapped for PLO level attainment by the individual student as well.			

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

REMARKS (if any):

Recommended by: _____

(Chairperson/Date)

Approved by: _____

(Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CE-452 Procurement Management**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-12 Responsible Consumption and Production

COURSE CONTENTS

Key Concepts: Overview of Procurement and its Management; Relationship with Organizational Success and Supply Chain Management; Key Procurement Skills; Procurement Cycle; Critical Success Factors and Key Considerations

Public Procurement: Goals; Categories; Importance; Key Principles; Participants, Stakeholders and Beneficiaries; An Overview of SPPRA, SPPRA Act and Rules.

Procurement Planning: Standard as per PMI PMBOK; Key Significance; Key Challenges/ Issues; Key Considerations; Key Components of the Procurement Plan; Procurement Plan Standards and Best Practices; Related SPPRA Rules.

Procurement Methods: Procurement Methods for Goods, Works, Consulting and Non-Consulting Services; Selection of Appropriate Method; Cases.

Preparation of Bidding Documents and NIT: Preparation of SBDs for Works; Preparation of RFP for Intellectual Services; RFQs; NIT and the Advertisement Process; Related SPPRA Rules; Cases

Conducting; Administering and Closing Procurements: Standard as per PMI PMBOK; Pre-Bid Meetings; Prequalification and Post Administering and Qualification; Bid Submission and Opening; Bid Evaluation (Technical Financial); Life Cycle Cost and Value Aspects; Risk Management in Procurement; Blacklisting; Procurement Closeout; Related SPPRA Clauses; Cases

Recent Advancements in Procurement Management: Overview of Best Practices such as Lean, Sustainable and other Recent/ Advanced Procurement Strategies.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**UNDERSTAND** the fundamental concepts of procurement and public procurement	**C1**	Engineering Knowledge
2.	**ILLUSTRATE** various aspects of procurement including planning, methods and document preparation	**C3**	Engineering Knowledge
3.	**OUTLINE** procedures of the public procurement in practice *	**C4**	Project Management and Finance
* This CLO's assessment is mapped for PLO level attainment by the individual student as well.			

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-451 Modern Aspects of Construction Project Management	✓ SPRING ☐ FALL	TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-8 Decent Work and Economic Growth
SDG-9 Industrial Innovation and Infrastructure
SDG-11 Sustainable Cities and Communities
SDG-12 Responsible Consumption and Production

COURSE CONTENTS

The Art of Project Management: Key Project Management Competencies and Skills Needed to be an Effective Project Manager.

Project Procurement Management: Project Delivery System, Project contracts/ Payment; Schemes, Considerations for Selection of Right Delivery System and Contract Type, Contract Award Mechanisms and Associated Issues.

Overview of Regulatory Environment: Local Industry Organizations Regulating Construction Business, Overview of Engineering and Professional Registration; Contractor Licensing; Coordination between Allied Agencies, Approvals, Authorities Having Jurisdiction.

Jobsite Management: Site organization; Staffing; Subcontracting; Construction Ethics; Job Commencement; Construction Operations; Jobsite Management; Documentation and Record Keeping on Jobsite; Submittals; Samples; Shop Drawings; Jobsite Layout and Control;

Construction Quality Management: Concepts, Principles, Views, Relationship with Value and Organizational Excellence, Quality Management, Four Stages of Quality Management, Inspection, Quality Control, Quality Assurance, Overview of ISO, Total Quality Management, From QA to TQM, Cost of Quality, TQM Implementation in Construction Industry, Establishing and Maintaining a Total Quality Culture, ISO 9000 and TQM, Overview of Quality Tools.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**ANALYSE** case studies/scenarios related to interpersonal managerial and leadership skills modern project management *	**C4**	Project Management and Finance
2.	**EXPLAIN** legal systems, regulatory environment, procurement systems, and its requirements related to the construction industry of Pakistan	**C2**	The Engineers and The World
3.	**DESCRIBE** elements of equality, health, safety & Environment of a construction project	**C2**	Project Management and Finance

*****This CLO's assessment is mapped for PLO level attainment by the individual student as well.

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CN-444 Leadership and Human Skills in Management**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	DATE OF COURSE CONTENT APPROVAL **July 2025**	APPLIED FROM BATCH **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-12 Responsible Consumption and Production

COURSE CONTENTS

Leadership: Definition, Influence, Social Network Building, Leadership and Ethics, Building Trust, Qualities and Skills of an Effective Leader, Motivation and Inspiration, Leadership Styles.
Team Building and Teamwork: Team Building Approaches, Situational Factors, Building High Performance Project Teams, Character Traits and Teamwork, Handling Conflict, Inhibitors of Teamwork, Rewarding Team Performance, Multicultural Teams, Team Pitfalls.
Effective Communication: Inhibitors, establishing a Conducive Communication Climate, Improving Communication, Improving Interpersonal Skills, Personality and Communication.
Education and Training: Training Needs Assessment, Effective Training Provision, Evaluating Training, Managers as Trainers and Trainees, Workforce Literacy, Performance Appraisal.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** the concepts of leadership. management, team-building, communication, productivity, and training	**C2**	Engineering Knowledge
2.	**ANALYSE** case studies related to team-building, motivation, and conflict resolution at workplace *	**C4**	Project Management and Finance

* This CLO's assessment is mapped for PLO level attainment by the individual student as well.

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CN-443 Management and Marketing of Construction Services	✓ SPRING ☐ FALL	TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-9 Industrial Innovation and Infrastructure
SDG-12 Responsible Consumption and Production

COURSE CONTENTS

Introduction: Nature of Construction Business, Primary Causes of Business Failure, Introduction to Organizational Behavior.

Company Organization: Alternative Forms of Business Organization.

Strategic Planning and Management: Introduction, Planning Process: Mission Statement; Vision; Strategic Assessment; Strategic Objectives; Strategy Formulation, Strategy Implementation, Strategy Evaluation, Organization Strategy and Project Selection, Project Portfolio Management.

Organizational Structures and Culture: Functional Structure, Dedicated Project Teams, Matrix Structure, Network Organization, Advantages and Disadvantages, Choosing the Right Structure, Organizational Culture.

Human Resources Management: Job Design and Analysis, HR Planning, Recruiting Employees, Performance Management, Employee Retention, Safety and Wellness.

Business Development: Marketing Construction Services, Marketing Process, Market Analysis: Demand Assessment; Customer Satisfaction Assessment; Competition Assessment, Marketing Strategies, Marketing Tools, Marketing Plan, Acquisition of Work.

Financing a Company's Financial Needs: Sources of capital; Financing with bonds; Financing through retained profit; Financial and Funding Institutions; Loans: Long-Term, Short-Term, Financial Documents.

Managing Inter- Organizational Relations: Sustaining Collaborative Relationships, The Art of Negotiating, Managing Customer Relations.

Problem Solving and Decision Making: Problem Solving, The Decision-Making Process, Objective Versus Subjective Decision Making, Employee Involvement, Role of Information.

Knowledge and Information Management in Construction: Overview of the Nature and Dimensions of Knowledge Management, Construction as Knowledge Based Industry, Knowledge Management Process, Overview on Application of Knowledge Management to Construction Business.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLOs	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** the basics of business organization and different forms of business organization	**C2**	Project Management and Finance
2.	**ANALYSE** the construction market forbusiness development *	**C4**	Project Management and Finance
3.	**APPLY** problem solving skills in decision-making processes	**C3**	Project Management and Finance

* This CLO's assessment is mapped for PLO level attainment by the individual student as well.

REMARKS (if any):

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Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE **CF-401 Professional Ethics**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ✓2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **July 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-4 Quality Education
SDG-5 Gender Equality
SDG-9 Industrial Innovation and Infrastructure
SDG-10 Reduced Inequalities
SDG-13 Climate Action
SDG-16 Peace, Justice and Strong Institution

COURSE CONTENTS

Introduction to Professional & Engineering Ethics: Definitions - Ethics, Professional Ethics, Engineering Ethics, Business Ethics; Ethics & Professionalism. Need and scope of Engineering and Professional Ethics through Case Studies. Development of Engineering Ethics & Major Issues in Engineering & Professional Ethics
Moral Reasoning & Ethical Frameworks: Ethical Dilemma: Resolving Ethical dilemmas and making Moral Choices. Codes of Ethics (of local and international professional bodies). Moral Theories: Utilitarianism, Rights Ethics and Duty Ethics, Virtue Ethics, Self-Realization & Self-Interest. Ethical Problem-Solving Techniques: Line Drawing, Flowcharting, Conflict Resolution. Case Studies and Applications.
Contemporary Professional Ethics: Professional Responsibilities. Risk and Safety as an Ethical Concern for Engineers Workplace Responsibilities and Ethics: Teamwork, confidentiality and conflicts of interest, Whistleblowing, Bribe and gift, risk and cost-benefit analyses, gender discrimination and sexual harassment. Environmental Ethics. Computer Ethics & the Internet. Honesty: Truthfulness, trustworthiness, academic and research integrity

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**KNOW** the contemporary framework of Professional Ethics	**A**	The Engineers and the World
2.	**ANALYZE** and solve problems using ethical problem-solving process and techniques	**C4**	Ethics
3.	**DEMONSTRATE** and follow ethical codes and values to promote ethical culture	**C3**	Individual and Collaborative team work
4.	**RECOGNIZE** and value professional, aspirational, and collective ethics for continual professional development	**A**	Life-long learning

REMARKS (if any):

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

Recommended by: _____ **Approved by: _____**

(Chairperson/Date) (Dean/Date)

NED University of Engineering and Technology

Department of Civil Engineering
Bachelor of Engineering Civil

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE **CF-402 Occupational Safety and Health**	SEMESTER ✓ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ☐2 ✓1 ☐0 PR ☐3 ☐2 ☐1 ✓0
PREREQUISITE COURSE(S) --	**DATE OF COURSE CONTENT APPROVAL** **To be approved in May 2025**	**APPLIED FROM BATCH** **2025**

MAPPED SUSTAINABLE DEVELOPMENT GOAL(s) (SDG(s))

SDG-3 Good Health and Well-being
SDG-4 Quality Education
SDG-9 Industrial Innovation and Infrastructure

COURSE CONTENTS

Health and Safely Foundations: Nature and scope of health and safety, Reasons/benefits and barriers for good practices of health and safety, Legal framework and OHS Management System

Fostering a Safety Culture: Four principles or safely- RAMP (Recognize, Assess, Minimize, Prepare), Re-thinking safety-learning from incidents, Safety ethics and rules, Roles and responsibilities towards safety, Building positive attitude towards safety, Safety cultures in academic institutions.

Recognizing and Communicating Hazards: Hazards and Risk, Types of hazards: Physical (mechanical and non-mechanical), Chemical (Toxic and biological agents), electrical, fire, construction, heat and temperature, noise and vibration, falling and Lifting etc., Learning the language of safety: Signs. symbols and labels, Finding Hazard Information, Material safety data sheets, Safety data sheets and the GHS (Globally Harmonized Systems)

Accidents & Their Effect on Industry: Costs of accidents, Time lost, Work injuries. parts of the body injured on the job, Chemical burn injuries, Construction injuries, Fire injuries.

Assessing and Minimizing the Risks from Hazards: Risk Concept and Terminology, Risk assessment procedure, Risk Metrics, Risk Estimation and Acceptability Criteria, Principles of risk prevention, selection and implementation of appropriate Risk controls, Hierarchy of controls

Preparing for Emergency Response Procedures: Fire, Chemical Spill, first Aid, Safety Drills/Trainings: Firefighting, Evacuation in case of emergency

Stress and Safety at work Environment: Workplace stress and sources, Human reaction to workplace stress, Measurement of workplace stress, Shift work, stress and safety, improving safety by reducing stress, Stress in safety managers, Stress and workers compensation

Incident Investigation: Importance of investigation, Recording and reporting, Techniques of investigation, Monitoring, Review, Auditing Health and Safety

NED University of Engineering and Technology

Department of Civil Engineering

Bachelor of Engineering Civil

Course Profile

F/QSP 11/17/01

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

CLO No.	CLO Statement	Taxonomy level	Mapped PLO
At the end of the course, the student will be able to:			
1.	**EXPLAIN** the core principles of occupational health and safety, workplace stress management and identify the types of risks and mitigation.	**C2**	The Engineer and the World
2.	**ADOPT** procedures to the standard safety practices with risk mitigation strategies in the workplace.	**A3**	Lifelong Learning

REMARKS (if any):

Recommended by: _____ (Chairperson/Date)

Approved by: _____ (Dean/Date)