NED University of Engineering and Technology

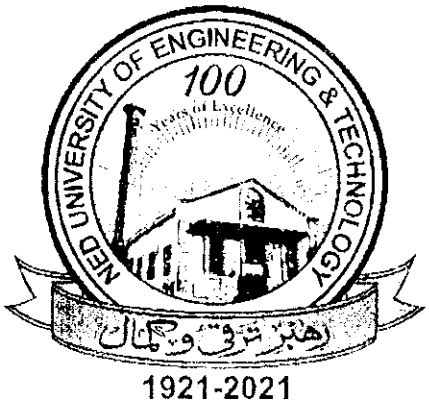
Department of Petroleum Engineering

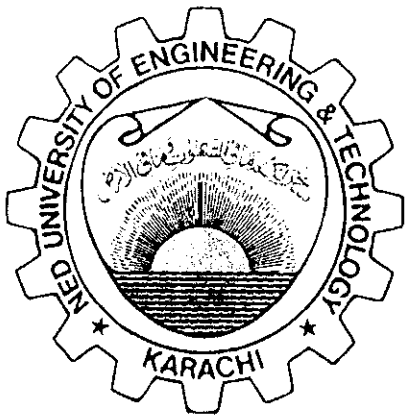
Bachelor of Engineering in Petroleum

DEPARTMENTAL OUTCOME BASED EDUCATION (OBE)

CATALOGUE

Batch 2021 and Onwards





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Contents

1. Vision Statement

a. University Vision

Be a leader in enabling Pakistan's social and economic transformation.

b. Department Vision

To educate and prepare the students for the exploitation of hydrocarbon resources of world in general and of Pakistan in particular, in the most technically, economically and environmentally viable manner.

2. Mission Statement

a. University Mission

Acquire education and research excellence in engineering and allied disciplines to produce leadership and enabling application of knowledge and skills for the benefit of the society with integrity and wisdom.

b. Programme Mission

To produce quality professionals equipped with problem solving skills, ethical values, health and safety standards, and skills to petroleum engineering principles in order to serve the industry, academia and other R&D institutes.

3. Program Educational Objectives (PEOs)

The Petroleum Engineering programme at the Department of Petroleum Engineering produces graduate who:

PEO-1: Exhibit comprehensive understanding of applied sciences integrated with core knowledge of Petroleum Engineering discipline using technological innovation.

PEO-2: Communicate and work efficiently to solve diverse engineering challenges.

PEO-3: Pursue successful professional practices considering inter-disciplinary prospects for the sustainable development of the environment and society.

PEO-4: Work independently as well as in multi-disciplinary teams proficiently with determination for life-long learning.

4. Mapping of PEOs to University and Departmental Vision and Mission

Vision and Mission		Program Educational Objectives (PEOs)			
		PEO-1	PEO-2	PEO-3	PEO-4
University Vision	Be a leader[1,4] in enabling Pakistan's social[3] and economic transformation[2].	✓	✓	✓	✓
University Mission	Acquire education and research excellence in engineering and allied disciplines[1] to produce leadership[4] and enabling application of knowledge and skills for the benefit of the society[3] with integrity and wisdom[2].	✓	✓	✓	✓
Department's Vision	To educate and prepare the students[4] for exploitation of hydrocarbon resources of world[2] in general and of Pakistan in particular, in the most technically[1], economically and environmentally[3] viable manner.	✓	✓	✓	✓
Programme's Mission	To produce quality professionals[1,3] equipped with problem solving skills[2], ethical values, health and safety standards and skills to petroleum engineering principles in order to serve the industry[4], academia and other R&D institutes.	✓	✓	✓	✓

5. Program Learning Outcomes (PLOs)

The following graduate attributes, as defined by Pakistan Engineering Council (PEC), have been adopted as Program Learning Outcomes (PLOs) by the department:

PLO-1 Engineering Knowledge: An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PLO-2 Problem Analysis: An ability to identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PLO-3 Design / Development of Solutions: An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PLO-4 Investigation: An ability to investigate complex engineering problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.

PLO-5 Modern Tool Usage: An ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations.

PLO-6 The Engineer and Society: An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solution to complex engineering problems.

PLO-7 Environment and Sustainability: An ability to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

PLO-8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

PLO-9 Individual and Teamwork: An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.

PLO-10 Communication: An ability to communicate effectively, orally as well as in writing, on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PLO-11 Project Management: An ability to demonstrate management skills and apply engineering principles to one's own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.

PLO-12 Lifelong Learning: An ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

6. Mapping of PLOs to PEOs

Program Learning Outcomes (PLOs)	Program Educational Objectives (PEOs)			
	PEO-1	PEO-2	PEO-3	PEO-4
PLO 1: Engineering Knowledge	✓			
PLO 2: Problem Analysis		✓		
PLO 3: Design / Development of solutions		✓		
PLO 4: Investigation		✓		
PLO 5: Modern Tool Usage	✓			
PLO 6: The Engineer and Society			✓	
PLO 7: Environment and Sustainability			✓	
PLO 8: Ethics			✓	
PLO 9: Individual and Team Work				✓
PLO 10: Communication		✓		
PLO 11: Project Management				✓
PLO 12: Lifelong Learning				✓

7. Scheme of Studies

Petroleum Engineering

First Year

Fall Semester					Spring Semester				
Course Code	Course Title	Credit Hrs			Course Code	Course Title	Credit Hrs		
		Th	Pr	Total			Th	Pr	Total
PE-103	Fundamentals of Petroleum Engineering	2	0	2	PE-104	Applied Petroleum Geology	2	1	3
EE-124	Basic Electricity and Electronics	2	1	3	ME-101	Engineering Mechanics	3	1	4
ME-111	Engineering Drawing	2	1	3	HS-205/ HS-209	Islamic Studies / Ethical Behavior (For Non Muslims)	2	0	2
CY-109	Applied Chemistry	3	1	4	PH-127	Applied Physics for Engineers	2	1	3
MT-114	Calculus	3	0	3	HS-111	Functional English	2	0	2
HS-106/ HS-107	Pakistan Studies / Pakistan Studies (for Foreigners)	1	0	1	PE-105	Computer Programming & Application	1	2	3
	Total	13	3	16		Total	12	5	17

Second Year

Fall Semester					Spring Semester				
Course Code	Course Title	Credit Hrs			Course Code	Course Title	Credit Hrs		
		Th	Pr	Total			Th	Pr	Total
MT-221	Linear Algebra & Ordinary Differential Equations	3	0	3	PE-211	Introduction to Data Sciences	2	1	3
HS-218	Business Communication	2	1	3	PE-212	Reservoir Fluid Properties	2	1	3
PE-208	Reservoir Petrophysics	2	1	3	PE-209	Fluid Mechanics	3	1	4
CE-212	Mechanics of Solids	3	1	4	PE-213	Drilling Engineering-I	2	1	3
PE-210	Thermodynamic-I	2	1	3	MT-331	Probability & Statistics	3	0	3
UE-270	Surveying and Geo informatics	1	1	2	HS-229/ HS-230	Social Sciences Elective	2	0	2
HS-200	Community Service Course	NC							
	Total	13	5	18		Total	14	4	18

Third Year

Fall Semester					Spring Semester				
Course Code	Course Title	Credit Hrs			Course Code	Course Title	Credit Hrs		
		Th	Pr	Total			Th	Pr	Total
PE-314	Petroleum Production Economics	2	0	2	PE-318	Drilling Engineering II	3	1	4
PE-315	Structural Geology & Geophysical Exploration	3	0	3	PE-321/ PE-322/ PE-323	Elective I	2	0	2
PE-316	Subsurface Production Engineering	3	0	3	PE-319	Reservoir Engineering-I	3	1	4
PE-317	Natural Gas Engineering	2	1	3	PE-320	Fundamentals of Well Logging	2	1	3
EL-305	Instrumentation & Control	3	1	4	MT-471	Applied Numerical Methods	2	1	3
HS-219	Professional Ethics	2	0	2	HSK-I/ HS-231	Chinese Language / Turkish Language Course-I	NC		
	Total	15	2	17		Total	12	4	16

Final Year

Fall Semester					Spring Semester				
Course Code	Course Title	Credit Hrs			Course Code	Course Title	Credit Hrs		
		Th	Pr	Total			Th	Pr	Total
PE-415	Reservoir Simulation	3	1	4	PE-418	Oil and Gas Field Production Facilities	3	1	4
PE-416	Reservoir Engineering-II	2	1	3	PE-419	Water Flooding and Enhanced Oil Recovery	3	1	4
PE-423/ CS-323/ PE-424	Elective II	3	1	4	PE-421	Well Testing	3	1	4
PE-417	Project Planning & Management	3	0	3	PE-422	Petroleum Property, Environment & Safety Management	3	0	3
PE-410	*Petroleum Engineering Project	0	3	3	PE-410	Petroleum Engineering Project	0	3	3
HSK-II/ HS-232	Chinese Language / Turkish Language Course-II	NC							
	Total	11	6	17		Total	12	6	18

** Duration one academic year: Requires literature survey and preliminary work during this Semester*

Social Sciences Elective (To be chosen from the following)

Course Code	Course Title	Credit Hours		
		Theory	Practical	Total
HS-229	Anthropology	2	0	2
HS-230	Organizational Behavior	2	0	2

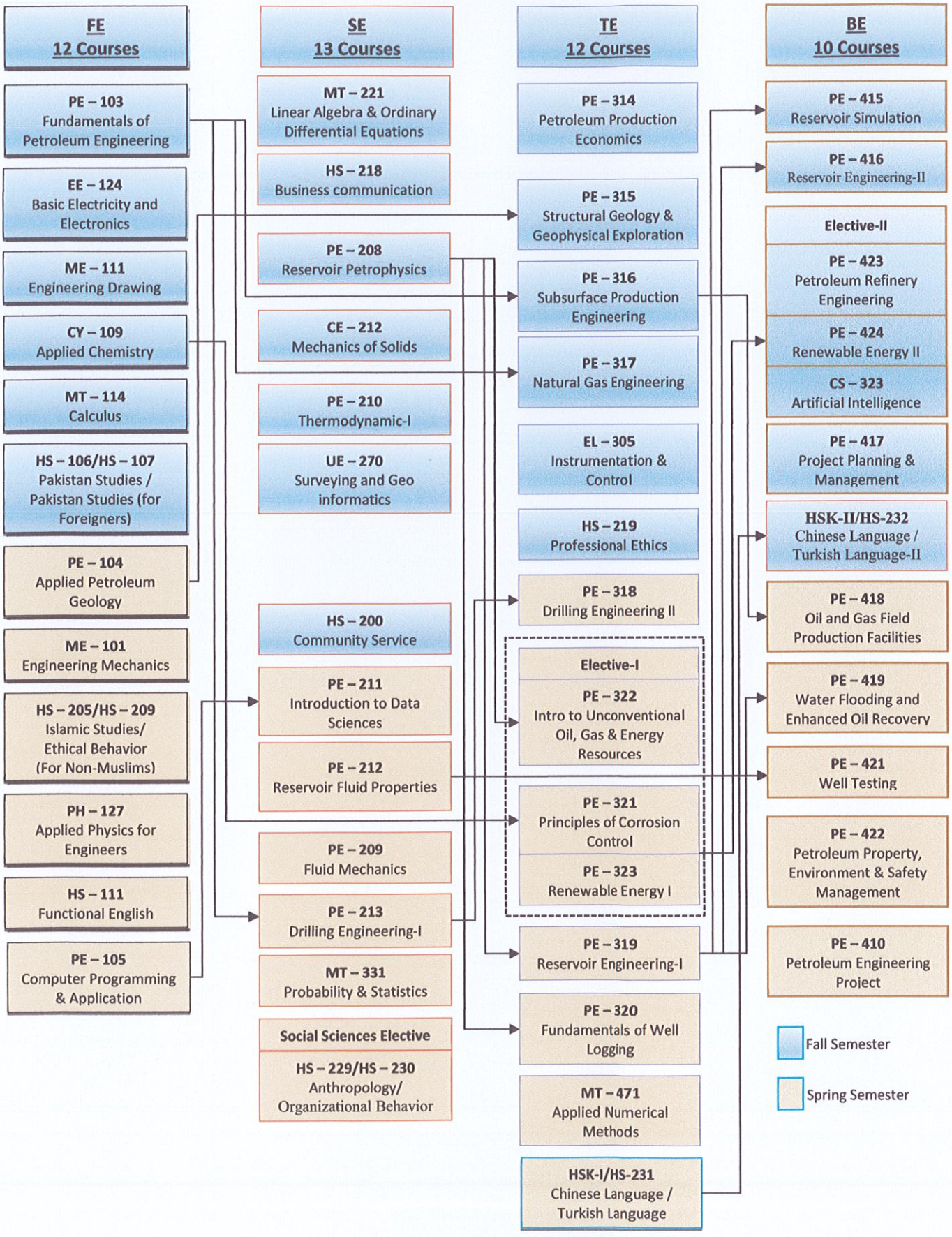
Elective-I (To be chosen from the following)

Course Code	Course Title	Credit Hours		
		Theory	Practical	Total
PE-321	Principles of Corrosion Control	2	0	2
PE-322	Introduction to Unconventional Oil, Gas & Energy Resources	2	0	2
PE-323	Renewable Energy I	2	0	2

Elective-II (To be chosen from the following)

Course Code	Course Title	Credit Hours		
		Theory	Practical	Total
PE-423	Petroleum Refinery Engineering	3	1	4
CS-323	Artificial Intelligence	3	1	4
PE-424	Renewable Energy II	3	1	4

Prerequisite Mapping



8. Mapping of Curriculum to PLOs

Bachelors in Petroleum Engineering Courses			Program Learning Outcomes (PLOs)											
			PLO-1	PLO-2	PLO-3	PLO-4	PLO-5	PLO-6	PLO-7	PLO-8	PLO-9	PLO-10	PLO-11	PLO-12
First Year	Fall	PE-103 Fundamentals of Petroleum Engineering	C2 C3						C2					
		EE-124 Basic Electricity and Electronics												
		ME-111 Engineering Drawing												
		CY-109 Applied Chemistry												
		MT-114 Calculus												
		HS-106/ HS-107 Pakistan Studies / Pakistan Studies (for Foreigners)						C2						C2
	Spring	PE-104 Applied Petroleum Geology	C1 C2			P1								
		ME-101 Engineering Mechanics												
		HS-205/ HS-209 Islamic Studies or Ethical Behavior (For Non Muslims)								C2 C2				
		PH-127 Applied Physics for Engineers												
		HS-111 Functional English										A3 C2 C6		
		PE-105 Computer Programming & Application	C2		C3		P3				A3			P3
Second Year	Fall	MT-221 Linear Algebra & Ordinary Differential Equations												
		HS-218 Business Communication										A3 C3 C6		
		PE-208 Reservoir Petrophysics	C2	C3			P3							
		CE-212 Mechanics of Solids												
		PE-210 Thermodynamic-I	C2	C3			P3							
		UE-270 Surveying and Geo informatics												
		HS-200 Community Service Course						A3						A2
	Spring	PE-211 Introduction to Data Sciences	C2	C3			P3			C2				C3
		PE-212 Reservoir Fluid Properties	C2 C3	C3			P3							
		PE-209 Fluid Mechanics	C2	C3		C4	P3							
		PE-213 Drilling Engineering-I		C3		P3		C2						
		MT-331 Probability & Statistics												
		HS-229/HS-230 Social Science Elective						C2 C2 C3						

Bachelors in Petroleum Engineering Courses			Program Learning Outcomes (PLOs)											
			PLO-1	PLO-2	PLO-3	PLO-4	PLO-5	PLO-6	PLO-7	PLO-8	PLO-9	PLO-10	PLO-11	PLO-12
Third Year	Fall	PE-314 Petroleum Production Economics		C3						C2				C 2
		PE-315 Structural Geology & Geophysical Exploration	C2			P3		C2						C 3
		PE-316 Subsurface Production Engineering	C2	C3					C3					
		PE-317 Natural Gas Engineering	C2			P3		C2						
		EL-305 Instrumentation & Control												
		HS-219 Professional Ethics								C2 C3 A3				
	Spring	PE-318 Drilling Engineering II	C2			C3	P3				A3		C2	
		PE-321/ PE-322/ PE-323 Elective I	C2	C3					C2	C2				
		PE-319 Reservoir Engineering-I	C2	C3	C3		P3							
		PE-320 Fundamentals of Well Logging	C2			P3					A3	A3		
		MT-471 Applied Numerical Methods												
		HSK-I/HS-231 Chinese Language/ Turkish Language Course-I												
Fourth Year	Fall	PE-410 Petroleum Engineering Project		C	C				C	A	A	A	A	
		PE-415 Reservoir Simulation	C2	C3	C5		P3				A3			
		PE-416 Reservoir Engineering-II	C2	C3	C5		P3							C 4
		PE-423/ CS-323/ PE-424 Elective II												
		PE-417 Project Planning & Management	C2								A3	A3	C3	C 3
		HSK-II/HS-232 Chinese Language/Turkish Language Course-II												
	Spring	PE-410 Petroleum Engineering Project		C	C					A	C A	C A	C	C
		PE-418 Oil and Gas Field Production Facilities	C2				P3		C2				C3	
		PE-419 Water Flooding and Enhanced Oil Recovery	C2		C5	P3							C3	
		PE-421 Well Testing	C2		C5	C3 P3								
		PE-422 Petroleum Property, Environment & Safety Management						C2	C2	C2		A3	C3	
		Internship	C	C				A		A	A	A		

9. Key Performance Indicators (KPIs)

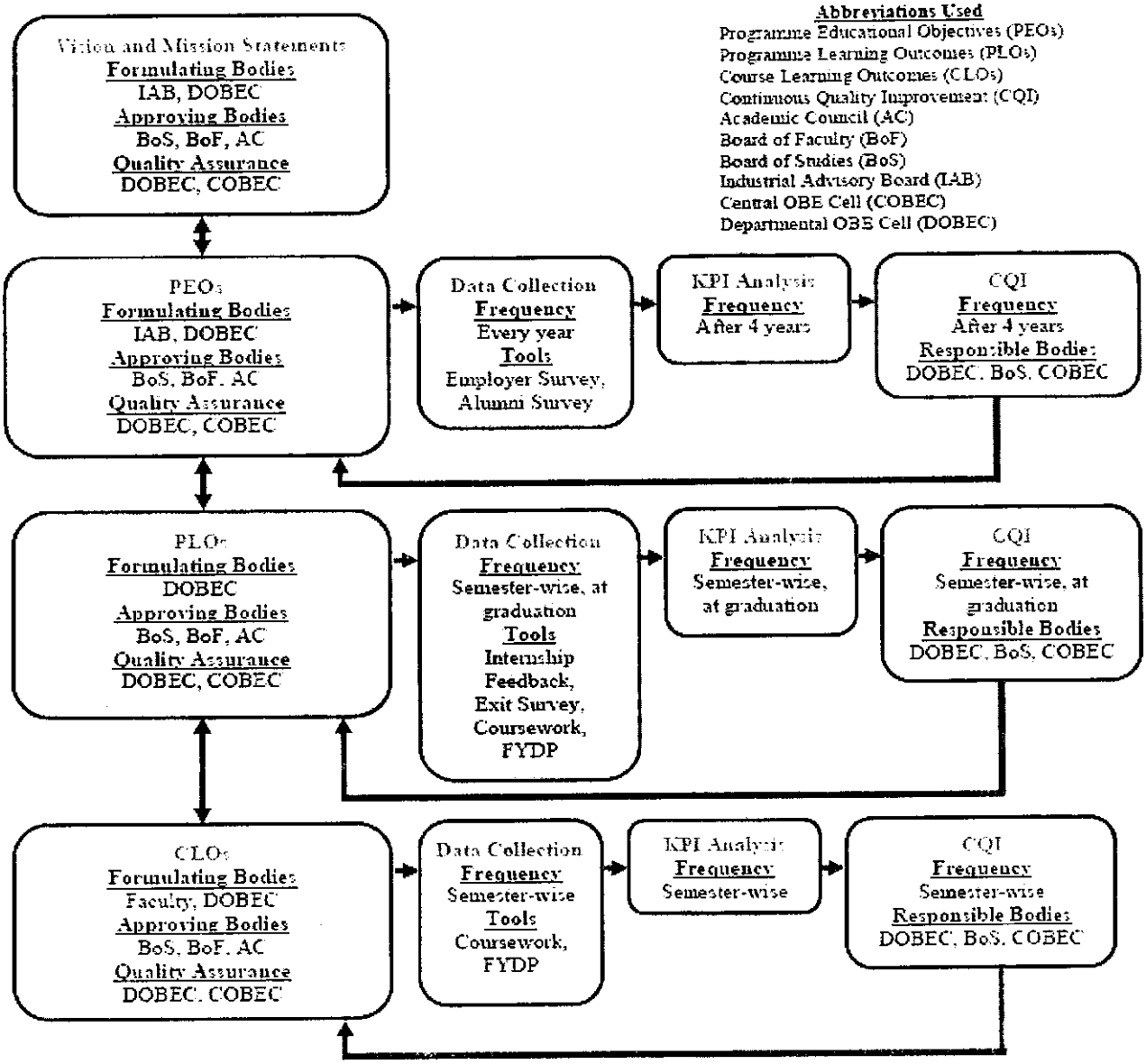
		Evaluation Tool	KPI	Data Collection Frequency	Analysis Frequency
PEO	Programme	▪ Employer Feedback Survey ▪ Alumni Feedback Survey ▪ Employment Statistics	50% of the Survey Form responses must attain a score of 3 or above (on a scale of 1 to 5), and 50% of the graduates must be employed and/or engaged in higher studies.	Every Year	4 years from Graduation
PLO	Student	▪ CLO scores of the student in the mapped course(s)	Each PLO must be attained in at least 50% of the respective mapped course(s), with an average score of at least 50%.	Every Semester	Every Semester
	Course	▪ PLO scores of all the students in the mapped course	At least 50% of the students must attain that PLO.	Every Semester	Every Semester
	Programme	▪ Final PLO attainment statistics of all the courses including FYDP ▪ Internship Feedback Form ▪ Exit Survey	At least 50% of the mapped courses must attain the PLO and at least 50% of the students/ responses must attain a score of 3 or above on a scale of 1 to 5.	At Graduation	At Graduation
CLO	Student	▪ Course work	The student must obtain at least 50% average percentage score from all attempts.	Every Semester	Every Semester
	Course	▪ CLO scores of all students in the course	At least 50% of the students must attain that CLO.	Every Semester	Every Semester

10. Continuous Quality Improvement (CQI)

The following table shows the post KPI evaluation actions, severity-wise, as outlined in the Manual of Uniform OBE Framework.

	PEO CQI	PLO CQI			CLO CQI	
	Program KPI	**Student KPI**	**Course KPI**	**Programme KPI**	**Student KPI**	**Course KPI**
KPIs Achieved	▪ No Action	▪ No Action	▪ No Action	▪ No Action	▪ No Action	▪ No Action
KPIs Not Achieved	1. Review of curriculum strategies. 2. Review of assessment methods. 3. Review of the relevant KPIs. 4. Review of PEOs. 5. Revisions implemented.	1. Warning through the progressive attainment sheet. 2. Student counselling.	1. Review of teaching and learning process. 2. Review of CLOs assessment methods. 3. Review of CLO-PLO mapping and the relevant KPIs. 4. Review of curriculum design. 5. Revisions implemented.	1. Review of teaching and learning process. 2. Review of PLOs assessment methods. 3. Review of Course-PLO mapping and the relevant KPIs. 4. Review of curriculum design. 5. Revisions implemented.	1. Student provided further chances through direct assessment tools. 2. Student counseling.	1. Review of CLO assessment methods. 2. Review of CLOs and taxonomy levels. 3. Review of students' course feedback. 4. Review of CLO KPIs. 5. Faculty advice by Departmental OBE Cell. 6. Faculty training.

The following figure shows the overall OBE framework for an Engineering Programme as outlined in the Manual of Uniform OBE Framework.



11.Course Profiles

Course profiles for all courses offered are attached as follows:

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE & TITLE	SEMESTER	CREDIT HOURS
PE-103 Fundamentals of Petroleum Engineering	☐ SPRING ■ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Introduction: Petroleum engineering and petroleum industry. Origin, discovery, development and future prospects of Hydrocarbons. Petroleum play. Distribution of petroleum resources on local and international level. Important units.
Reservoir: Reservoir rock and flow properties. Introduction to Formation evaluation.
Drilling: The onshore and offshore operations. The rig functions, introduction to well planning, bits, introduction of drilling fluid and casing accessories.
Production: Introduction to production, processing and transportation. Well completion. Flow in pipes and surface production facilities. Introduction to Production forecasting, reserve categories. Environmental concerns. Corrosion and its control.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. #	Course Learning Outcomes (CLO)	Taxonomy Level	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Explain basic techniques, purposes and role of all important aspects of Petroleum Engineering, list, label and correctly identify the function of each equipment that are part of the rotary system.	C2	Engineering Knowledge
CLO 2	Carry out calculations related to reservoir properties and unit conversion for a given set of data.	C3	Engineering Knowledge
CLO 3	Explain the Environmental concerns related to Petroleum Exploration and Production Operations.	C2	Environment and Sustainability

REMARKS (if any):

Recommended by: _____ 31/8/22
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE & TITLE EE-124 Basic Electricity and Electronics	SEMESTER ☐ SPRING ■ FALL	CREDIT HOURS TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH: 2021

COURSE CONTENTS

Fundamentals of Electric Circuits: Charge, Current, Voltage and Power, Voltage and Current Sources. Ohm's Law
Voltage and Current Laws: Nodes, Paths, loops and Branches, Kirchhoff's Current law, Kirchhoff's Voltage Laws, the single loop.
Circuits: The single node-pair circuits, series and parallel connected. Independent sources, resistors in series and parallel, voltage and current division.
Basic Nodal and Mesh Analysis: Multi-Nodal Analysis, the super node, Mesh Analysis, the super mesh.
Circuit Analysis Techniques: Linearity and Superposition, Source Transformations, The venin and Norton Equivalent Circuits, Maximum Power Transfer, Delta-Wye Conversion
Capacitors and Inductors: Capacitors, Inductor, Inductance and Capacitance Combination
Basic RL and RC Circuits: The Source-Free RL Circuit, Properties of the Exponential Response, the Source-Free RC Circuits. The Unit-Steps Function and driven RL Circuits. Natural and forced response and driven RL Circuits.
The RLC Circuit: The Source-Free Parallel Circuit, the over damped parallel RLC Circuits, Critical Damping, the under damped Parallel RLC Circuit. The Source-Free Series RLC Circuit, the complete response of the RLC Circuit. The lossless LC Circuit

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Have understanding of basic circuit analysis laws and APPLY them to solve various circuits.	C3	Engineering Knowledge
CLO 2	To enable students to use various techniques to solve and analyze electric circuits and problems effectively.	C4	Problem Analysis
CLO 3	Have ability to manipulate various electrical circuits under guidance and are able to verify different network theorem experimentally.	P3	Design/ Development of Solutions

REMARKS (if any):

Recommended by: _____ 31/8/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE & TITLE ME-111 Engineering Drawing	SEMESTER ☐ SPRING ■ FALL	CREDIT HOURS TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH: 2021

COURSE CONTENTS

Drawing instruments and sheets; Importance of conventions and standards in engineering drawing Geometrical construction of plane figures, conic sections, cycloidal curves and involutes. Multi view projection and drawing using first and third angle projection methods Development of prisms, pyramids, cylinders and cones Sections of solids and machine components Types of pictorial views and drawing isometric view Dimensioning techniques, size and geometric tolerance and their symbols, types of fits Construction of curves from intersection of solids such as cones, cylinders, prisms and pyramids Sketching of temporary and permanent fasteners like bolts, nuts and rivets, shaft couplings, connecting rod, bearings, pulleys, locking devices; Types of thread Types of working drawing, construction of views of the assembled objects / components. Construction of process flow diagrams; symbols for piping, instruments and equipment

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Explain basic concepts of engineering drawing as an important form of conveying technical information	C2	Engineering Knowledge
CLO 2	Apply principles of engineering visualization and projection theory to prepare engineering drawings, using conventional and modern drawing tools	C3	Modern Tool Usage
CLO 3	Practice drawing orthographic projection, sectional views, and isometric views of different mechanical parts	P3	Engineering Knowledge

REMARKS (if any):

Recommended by: _____ 31/8/2021 **Approved by:** _____

(Chairperson/Date) **(Dean/Date)**

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CY-109 Applied Chemistry	☐ SPRING ■ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Gases: Gas Laws. Kinetic gas equation. Vandar Waal's Equation, Critical phenomenon. Liquidification of gases, specified heat (molar heat capacity), properties of Solution Surface Tension, Viscosity, Osmosis and Osmotic Pressure. **PH-Buffer Solution & Liquids:** Spectrophotometer, Basic concepts of Colloidal Chemistry. Classification purification (dialysis). Thermo-chemistry: Chemical thermodynamics, Hess's Law. Heat of reaction, Bomb Calorimeter, Relation between H and U measurement of heat reaction.

Electrochemistry: Laws of Electrolysis. E.M.F. series. Corrosion (Theories, inhibition & protection)

Water & Sewage: Sources of water, impurities, hardness, water softening, purification of water for potable and industrial purposes, electro-dialysis and introduction to environmental pollution. Main sources and effects. Sewage treatment.

Fuels: Types of fuels. Classification of fossil fuels.

Metals & Alloys: Properties and general composition of metals and alloys such as Iron, Copper, Aluminum, Chromium, Zinc used in engineering field Engineering Materials.

Inorganic Engineering Materials: Cement. Class Organic engineering materials: Polymers, Rubbers. Plastics and Paints, Semiconductors and Dielectric.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	EXPLAIN the concepts of physical and analytical chemistry for engineering applications.	C2	Engineering Knowledge
CLO 2	SOLVE problems of fluids and fuels, thermo & electrochemistry.	C3	Problem Analysis
CLO 3	APPLY the concepts of applied chemistry to industrial processes.	C3	Problem Analysis
CLO 4	OPERATE the equipment with guidance to measure physical & chemical parameters	P3	Engineering Knowledge

REMARKS (if any):

Recommended by: 31/8/2022

(Chairperson/Date)

Approved by:

(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
MT-114 Calculus	☐ SPRING ■ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Sets 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, operations. Venn diagrams, DeMorgan'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: Differentiations and Successive differentiation and its application: Lebnitz theorem. Taylor and Maclaurin theorems with remainders in Cauchy and Lagrange form, power series. Taylor and Maclaurin series, L Hopitals rule, extreme value 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, exact differential and its application in computing errors, 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 Centre of pressure and depth of centre of pressure.

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

Complex Numbers: 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 OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Identify functions and define real and complex numbers	C1	Engineering Knowledge
CLO 2	Apply differential and integral calculus to engineering problems.	C3	Problem Analysis
CLO 3	Discuss the behavior of sequence and series.	C2	Problem Analysis

REMARKS (if any):

Recommended by: _____ 31/8/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE & TITLE	SEMESTER	CREDIT HOURS
HS-106 Pakistan Studies	☐ SPRING ■ FALL	TH ☐3 ☐2 ■1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Historical and ideological Two Nation Theory: Claim of Muslims of being a separate nation from Hindus, perspective of Pakistan based upon cultural diversity. Cultural diversity and interests as bases for the Movement: demand of Pakistan – Lahore resolution.

Creation of Pakistan: Factors leading to the creation of Pakistan, Quaid-e-Azam and the demand of Pakistan

Constitutional Process: Constitutional and Political developments in Pakistan 1947-1973. Salient features of the Constitutions 1956, 1962 and 1973 and amendments.

Land of Pakistan: Geo-physical conditions, Geo-political and strategic importance of Pakistan, Natural resource, viz: mineral, water and power

Contemporary issues in Pakistan: A brief survey of Pakistan Economy: problems, issues and future prospects. Pakistani Society and Culture-Broad features with emphasis on youth role in the development of Pakistan.

Literacy and education in Pakistan: problems and issues. State of Science and Technology in Pakistan: A comparison with other countries with special reference to the Muslim world.

Environmental issues in Pakistan: government policies and measures and suggestions for improvement. Pakistan's role in the preservation of nature through international conventions / treaties

Human Rights in Pakistan: Pakistan's response to human rights issues at national &international levels. Pakistan's Foreign Policy Urbanization in Pakistan - problems and issues

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Understand the historical and ideological perspectives of Pakistan and their implications for individuals and professionals in societal contexts	C2	The Engineer and Society
CLO 2	Explain the strategic implications of international conventions and treaties applicable to Pakistan at the national and international level	C2	Lifelong Learning

REMARKS (if any):

Recommended by: _____ 31/8/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
HS-107 (Pakistan Studies for Foreigners)	☐ SPRING ■ FALL	TH ☐3 ☐2 ■1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Land of Pakistan:

Land & People – Physical features and demography, Geographical and strategic importance of Pakistan, Natural resources – Mineral, water, and power, Natural Landscape, Environmental issues in Pakistan, Cultural heritage: important remnants of ancient civilizations in Pakistan

Creation of Pakistan:

A brief Historical survey of Muslim community in the sub-continent, Two-Nation theory – its origin & development, Rationale for Pakistan – Factors leading to the demand of Pakistan, Emergence of Pakistan, Role of Quaid-e-Azam the struggle for Pakistan

Government & Politics in Pakistan:

Political History of Pakistan – A brief account (1947 to date), Constitution of Pakistan 1973 – Salient features, Governmental structure – Federal, Provincial and Local.

Pakistan in the Community of Nations:

An overview of Pakistan's foreign policy, Relations of Pakistan with neighbors, Super Powers, and the Muslim World

Pakistan's Stand Point on Human Rights:

Constitutional provisions, Comparative analysis of Western and Islamic perspective of Human Rights, Pakistan's Stand on national and international level

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe the historical, ideological, socio-economic, and political aspects of Pakistan as a nation and state.	C2	The Engineer and Society
CLO 2	Discuss Pakistan's culture, issues, and challenges through appropriate actions and advocacy	C2	Lifelong Learning

REMARKS (if any):

Recommended by: _____ 21/8/2024
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE PE-104 Applied Petroleum Geology	SEMESTER ■SPRING ☐FALL	CREDIT HOURS TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH: 2021

COURSE CONTENTS

Introduction: Introduction to various branches of geology, the origin of earth and its place in universe, interior of the earth, chemical composition of the earth's crust

Rock types and geological settings: Igneous, sedimentary, and metamorphic rocks formation and minerals, occurrence of mineral deposits in Pakistan Geological time scale, stratigraphy and correlation, Geological structures, agents of weathering and erosion.

Mountains, basins and plate tectonics: Theories of plate tectonics, mountain building and sedimentary basin of Pakistan, Earthquakes and seismic waves, earth surface processes, drainage patterns and their types, earthquakes, and volcanism.

Petroleum systems and elements: Origin of Petroleum, physical & chemical properties, composition of hydrocarbons, conventional and unconventional resources. Petroleum system and Elements and Potential petroleum reservoirs of Pakistan.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Define earth configuration, minerals, rocks, and Geological structures.	C1	Engineering Knowledge
CLO 2	Discuss the processes of internal and external origin.	C2	Engineering Knowledge
CLO 3	Identify the minerals properties, rocks origin, geological features and structures.	P1	Investigation

REMARKS (if any):

Recommended by: _____ 31/8/2021
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
ME-101 Engineering Mechanics	■SPRING ☐FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Statics of Particles: Forces in a plane; Newton's First Law, Free body diagram; Forces in space (rectangular components); Equilibrium of a particle in space.

Kinematics of Particles: Rectilinear and curvilinear motion of particles; Components of velocity and acceleration; Motion relative to a frame in translation.

Kinetics of Particles: Newton's Second Law; Dynamic equilibrium; Rectilinear and curvilinear motion; Work and energy; Kinetic energy of particle; Principle of Work and Energy; Conservation of energy; Impulse and momentum; Impulsive forces and conservation of momentum; Impact, direct and oblique; Conservation of angular momentum.

Rigid Bodies: Equivalent systems of forces; Principle of transmissibility; Moment of a force; Couple; Varignons Theorem. Centre of gravity of a three-dimensional body and centroid of a volume. Moments of inertia, radius of gyration, parallel axis theorem. **Equilibrium of Rigid Bodies:** Free-body diagram; Equilibrium in two and three dimensions; Reaction of supports and connections; Equilibrium of two-force and three-force bodies.

Kinematics of Rigid Bodies: General Plane motions; Absolute and relative velocity and acceleration.

Plane Motion of Rigid Bodies: Forces and acceleration; Energy and momentum; Conservation of linear and angular momentum.

Friction: Laws of dry friction; Angles of friction; Wedges; Square-threaded screws; Journal and thrust bearings; Belt friction.

Analysis of Structures: Internal forces and Newton's Third Law; Simple and space trusses; Joints and sections; Frames and machines. Forces in cables.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
	At the end of the course, the student will be able to:		
CLO 1	Define different theoretical concepts related to static and dynamic equilibrium for particles and rigid bodies	C1	Engineering Knowledge
CLO 2	Solve problems related to force moments and equilibrium in particles and/or rigid bodies	C3	Problem Analysis
CLO 3	Solve problems related to kinematics and kinetics of particles and/or rigid bodies	C3	Problem Analysis
CLO 4	Observe the material properties, stress and strain conditions for various materials	P1	Investigation

REMARKS (if any):

Recommended by: _____ 31/8/2021
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE HS-205 Islamic Studies	SEMESTER ■SPRING ☐FALL	CREDIT HOURS TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH: 2021

COURSE CONTENTS

Fundamentals of Islam: Tauheed, Arguments for the Oneness of God, Impact of Tauheed on human life, Place of Man in the Universe, Purpose of creation, Textual study of Surah Al-Rehman and Sura Al-Furqan, Prophet hood, Need for prophet, Characteristics of prophet, Finality of Prophet hood, Seerat life of the Prophet as embodiment of Islamic-Ideology, Faith in Here-after (AKHRAT), Effects of the beliefs on worldly life.

Ibadah: Concept of Ibadah, Major Ibadah, Salat, Zakat, Hajj and Jehad.

Basic Source of Shariah: The Holy Quran, Its Revelation and Compilation, The Authenticity of the Text, Hadith, Its Need, Authenticity and Importance, Consensus (Ijmaa), Analogy (Qiyas).

Sources of Knowledge: Islamic Approach to Intuition, Reason and Experience, Revelation (Wahi) as a Source of Knowledge.

Moral and Social Philosophy of Islam: The concept of Good and Evil, Akhlaq-e-Hasna with special reference to Surah Al-Hujrat, Professional Ethics (Kasb-e-Halal).

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Explain the given Quranic verses and Hadiths to their tangible meaning and message.	C2	Ethics
CLO 2	Describe the basic concepts of Shariah, the features of Seerat-un-Nabi (SAW), and the impact of Islam on our society.	C2	Ethics

REMARKS (if any):

Recommended by: _____ 21/9/2021
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
HS-209 Ethical Behavior (For Non-Muslims)	■SPRING ☐FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Introduction to Ethics: Definition of Ethics, Definition between normative and positive science, Problem of freewill, Method of Ethics, Uses of Ethics.

Ethical Theories: History of Ethics: Greek Ethics, Medieval, Modern Ethics, Basic concept of right and wrong: good and evil, Utilitarianism, hedonism, self-realization: egoism, intuitionism, rationalism; Kant's moral philosophy.

Ethics & Religion: The relation of Ethics to religion; Basic ethical principles of major religions: Hinduism, Judaism, Buddhism, Zoroastrianism, Christianity, Islam.

Ethics, Society, and moral theory: Ethical foundation of Rights and Duties, Applied Ethics, Society as the background of moral life, Universalism and Altruism, Theories of punishment.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Explain the ethical teachings of the world's major religions	C2	Ethics
CLO 2	Describe the importance and implications of ethics on individuals and societies	C2	Ethics

REMARKS (if any):

Recommended by: _____ **(Chairperson/Date)**

Approved by: _____ **(Dean/Date)**

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PH-127Applied Physics for Engineers	■SPRING ☐FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Properties of Matter: Elasticity and modulus of elasticity, Bending of beams, Cantilever

Fluids: Steady and turbulent flow, Bernoulli`s theorem, Viscosity, Surface tension, Surface energy, Angle of contact

Heat & Thermodynamics: Heat, temperature and theories of heat, Adiabatic and isothermal processes, The four laws of thermodynamics, Thermodynamic functions, Efficiency of heat engines, Carnot`s cycle, Entropy, Reversible process and cycles, Thermodynamic equilibrium, Introduction to heat transfer mechanisms

Optics: Waves and oscillations, Simple harmonic motion, Types of wave motion, Optics of light, Interference, Diffraction, Polarization, Double refraction, Dispersion, Types and uses of deviation lasers

Electricity and Magnetism: Electric charges, Electric field, Electric potential, Coulomb`s law, Gauss`s law, Capacitors and dielectrics, Electric current, Ohm`s law, Magnetic properties of matter, Magnetic field, Magnetic force on current, Ampere`s law, Faraday`s law, and Lenz`s law

Sound: Speed of sound , Different types of sound waves

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss principles of physics; and explain the concept of classical physics to solve related problems.	C2	Engineering Knowledge
CLO 2	Use the concept of physics for engineering problems.	C3	Problem Analysis
CLO 3	Practice of operating/tools to understand principles of physics under supervision.	P3	Engineering Knowledge

REMARKS (if any):

Recommended by: _____ **(Chairperson/Date)**

Approved by: _____ **(Dean/Date)**

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
HS-111 Functional English	■SPRING ☐FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Reading: Reading skills importance & strategies. Reading strategies: Previewing (Worksheets) Reading practice through variety of reading texts and comprehension exercises: Study Text. Reading Strategies: Skimming & Scanning. Summarizing: Evaluation. Vocabulary. Interference. Precis

Listening: Types of listening; active, content, critical, selective. Problems in listening and coping strategies. Listening skills and sub skills

Note Taking: Techniques for taking notes from lectures, from books (Lecture). Note taking in different forms paragraphs, points, figures, processes, tables, graphs etc. (Worksheets)

Vocabulary Development: Tips/strategies in vocabulary enhancement (Lecture + Worksheets). Practice in vocabulary development (Referred Book: English Vocabulary in Use by Michael McCarthy and Felicity O' Dell). Inferring meaning from context (Worksheets). Word formation (Worksheets). Idiomatic expressions (Worksheets)

Writing: Process of Writing and In formal Writing strategies (Lecture). Writing correctly: Sentence structure and punctuation, error correction (Classroom activity)

Paragraphs: Structure and types (Lecture). Topic and the topic sentence (Lecture + Worksheets). Unity, adequate development and coherence in paragraphs (Worksheets)

Essays: Types of essays: narrative, descriptive, argumentative (Lecture). Structure of essays: thesis statement and the paragraphs (Lecture+ Written Assignments)

Short Reports: Structure and format (Lecture). Informational and analytical reports (Lecture + Written Assignments)

Letters: Style, formatting (digital letter writing), organization and structure of the letter (Lecture). Types of letters: routine requests and intimation, invitation, thank you and condolence letters etc. (Lecture + Classroom Activity + Written Assignments)

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Demonstrate effective presentation skills in academic settings.	A3	Communication
CLO 2	Comprehend explicit and implicit information through reading and listening strategies.	C2	Communication
CLO 3	Compose drafts of various academic genres using writing processes and strategies.	C6	Communication

REMARKS (if any):

Recommended by: _____ 31/8/2021
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-105 Computer Programming & Application	■SPRING ☐FALL	TH ☐3 ☐2 ■1 ☐0 PR ☐3 ■2 ☐1 ☐0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Introduction: Introduction to programming languages, languages life cycle. Working of compilers.

Logic Development Skills: Introduction logic development and problem solving. Introduction to Algorithms and their application.

Basic Programming Constructs: Data types and scope of variables, pre-processor directives, input/-output constructs, types of operators (logical, arithmetic, relational, assignment), looping structures (for, while and do-while) conditional structures (if, if-else, switch, break and continue).

Arrays and Functions: Introduction to arrays, multidimensional arrays and application, functions and procedures, function overloading and values passing through functions, string and string operations, structures, file i/o operations.

Data analysis and visualization by software: Basics of software, formula editing, graphs and charts development for analysis.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

S. No.	CLOs	Taxonomy	Programme Learning Outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe the main syntaxes used in programming language and and its building structures.	Cognitive C2	Engineering Knowledge
CLO 2	Apply computer programming concepts to develop computer programs, which can solve problems with in engineering domain.	C3	Design/ Development of Solutions
CLO 3	Operate software for graphs and charts development for analysis.	P3	Lifelong Learning
CLO 4	Operate software for solving problems using different programming languages and tools.	P3	Modern Tool Usage
CLO 5	Desire to work individually and in teams during course related tasks and exercises.	A3	Individual and Team Work

REMARKS (if any):

Recommended by: _____ 31/8/2021
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE HS-218 Business Communication	SEMESTER ☐ SPRING ■ FALL	CREDIT HOURS TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■ 1 ☐0
PREREQUISITE COURSE(S) N/A	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH 2021

COURSE CONTENTS

Foundations of Business Communication:

Definitions: communication, organization, business; understanding the need and scope of business, professional and organizational communication, Conditions, properties, process, tools, modes, levels, types of communication. Principles of Effective Communication & Building goodwill (You-attitude, positive emphasis and unbiased language). Listening, non-verbal communication. Communication dilemmas and problems. Feedback and its types. Audience Analysis

Oral Communication:

Group Discussions and interpersonal skills, Meetings, Interviews, Making presentations

Business & Technical

Types of messages: Formats (Letter and memorandum). Letter and memorandum elements and formats. Three Types of Business Messages (routine, negative and persuasive communications). Organizational Plans: Direct, Indirect & AIDA approach. Writing business messages (e-mails, inquiries, requests, replies, regrets, declining offers, letters, routine messages, etc.). Meetings: notice, \ agenda and minutes. Job applications and resumes. Research / scientific reports (structure, layout, writing process)

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Demonstrate effective oral communication and interpersonal skills in simulated professional and business situations.	A3	Communication
CLO 2	Apply principles of effective communication in various types of business messages.	C3	Communication
CLO 3	Compose effective business messages for various purposes and audiences.	C6	Communication

REMARKS (if any):

Recommended by: _____ 31/8/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
MT-221 Linear Algebra & Ordinary Differential Equations	☐ SPRING ■ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

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, Diagonolization. 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 second 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 Equation

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 coefficients: Expansion of function with arbitrary periods. Odd and even functions and their Fourier series; Half range expansions of Fourier series.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe formation of differential equations and system of linear equations to explain physical situations.	C2	Engineering Knowledge
CLO 2	Apply appropriate methods to solve differential equations and system of linear equations of relevant engineering problems.	C3	Problem Analysis

REMARKS (if any):

Recommended by: _____ 31/8/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-208 Reservoir Petro physics	☐ SPRING ■ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■ 1 ☐0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Introduction

Introduction to Petrophysics, Introduction to Petrophysical properties; Porosity, Permeability, fluid saturation, compressibility, IFT, capillary pressure and wettability.

Description and measurement of Petro-physical properties

Factors affecting porosity, laboratory measurements of porosity, averaging porosity and water saturation data, pore volume compressibility. Permeability; dimensions, unit and its types, Klinkenberg effect, permeability laboratory determination of permeability, factors affecting permeability, permeability-porosity correlation, averaging permeability data. Interfacial phenomena and wettability; measurement techniques of IFT and wettability, effect of wettability on rock-fluid interaction. Capillary pressure; drainage and imbibition curves, capillary hysteresis, J-function. Reservoir fluid distribution. Pc data types and their relationship

Heterogeneity and Geo-statistics

Measures of central tendency and variability, measure of spatial continuity.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe fundamental petro-physical properties	C2	Engineering Knowledge
CLO 2	Solve problems related to petro-physical properties	C3	Problem Analysis
CLO 3	Operate various petro-physical equipment to determine different petro-physical properties	P3	Modern Tool Usage

REMARKS (if any):

Recommended by: _____ **(Chairperson/Date)**

Approved by: _____ **(Dean/Date)**

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
CE-212 Mechanics of Solids	☐ SPRING ■ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Different Stress States; Uniaxial state of stresses & strains; relationship between elastic constants; Responses of materials under different sets of monotonic loading; normal & shearing stress & trains; Gradually & suddenly applied loads; Distributions of direct stress on uniform & non-uniform members; thermal stresses & strain. Bending Theory; theory simple bending, position of neutral axis, moment of resistance and section modulus; bending & shearing stress distribution in beams; Relationship between load, shear force & bending moment; stresses in composite sections; curvature, slope & deflections of beams using integration methods. Biaxial State of Stress; biaxial state of stresses, resolution of stresses principal plane, principal stresses & strains; graphical representation of stresses & strain, Mohr's circle of stresses & strains. Theory of Torsion; theory of torsion of solid & hollow circular shafts, shearing stress distribution & angle of twist, strength & stiffness of shaft. Cylinders; analysis of thin & thick cylinders. Stability; struts & columns; euler, Rankin & other formula for bucking load of columns; stability analysis of columns under eccentric loading.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe the fundamental concepts of stress, strain, buckling on beams and columns	C2	Engineering Knowledge
CLO 2	Solve problems of the stress on a beam section, circular shafts and short columns due to tension, compression, torsion, bending, shear and combined loading	C3	Problem Analysis
CLO 3	Practice experiments and calculations for stresses and strains	P3	Investigation

REMARKS (if any):

Recommended by: _____ **(Chairperson/Date)**

Approved by: _____ **(Dean/Date)**

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-210 Thermodynamics –I	☐ SPRING ■ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■ 1 ☐0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Introduction

Fundamentals; thermodynamics properties, intensive and extensive properties; pressure; temperature.

Laws of Thermodynamics & its Applications

Zeroth Law of thermodynamics. Energy, potential energy; kinetic energy; internal energy; first law of thermodynamics; non-flow energy equation; steady flow energy equation; flow work, Reversibility. Second law of thermodynamics; entropy; uses of entropy. Behaviors of ideal gas, various gas equations; dryness fraction, sub cooled and superheated liquid. Raoult's law; Henry's Law.

Thermodynamics Cycles

Carnot cycle, Vapor power cycles; steam power plant; Air standard cycles; Diesel and Otto cycles. Refrigeration cycle; reversed Carnot;

Pump and Compressors

COP of heat pump and refrigerators. Reciprocating compressors.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Explain the fundamentals of thermodynamics, thermodynamics laws, cycles and processes.	C2	Engineering Knowledge
CLO 2	Apply the laws of thermodynamic to chemical and phase equilibrium problems	C3	Problem Analysis
CLO 3	Operate various devices to measure thermodynamical properties.	P3	Modern Tool Usage

REMARKS (if any):

Recommended by: _____ 31/8/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE UE-270 Surveying and Geo Informatics	SEMESTER ☐ SPRING ■ FALL	CREDIT HOURS TH ☐3 ☐2 ■1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH: 2021

COURSE CONTENTS

Fundamentals of Geo-Informatics Fundamentals of GIS, Components of GIS. Data models and structures. Coordinate System, Datum and map projection and their transformation.

Introduction To Engineering Surveying

Introduction basic surveying, Field data acquisition techniques, horizontal and vertical distance measuring, manual contouring and angle measurements.

Spatial Analysis and Remote Sensing (RS)

Spatial Analysis, Concept of Spatial layering in GIS, RS and its data acquisition method, RS applications for petroleum resource exploration.

Field and Computer Lab work

Conventional and modern equipment used in surveying, Introduction to Geo-informatics software, geo database development, geo-referencing, spatial data analyses and layout design.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss the principles of Engineering Surveying	C2	Engineering Knowledge
CLO 2	Describe the fundamental principles of Geo-informatics	C2	Engineering Knowledge
CLO 3	Handle spatial data and Geo-processing.	C3	Problem Analysis
CLO 4	Observe readings of surveying instruments.	P1	Modern Tool Usage

REMARKS (if any):

Recommended by: _____ 31/8/2021
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-211 Introduction to Data Sciences	■ SPRING ☐ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■ 1 ☐0
PREREQUISITE COURSE(S) PE-105 Computer Programming & Application	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Basics of Data and its Analysis

Basic data acquisition, cleaning, manipulation and pre-processing. Introduction to data analysis tools, Descriptive statistics, Data structures, Introduction to hypothesis testing and statistical inference.

Data Modeling and Visualization

Data understanding and preparation, Linear Regression, Classification methods, including logistic regression, k-nearest neighbors, decision trees, and support vector machines, Exploratory data analysis and visualization. Implementing and validating linear and penalized regression, basic classification and basic clustering methods. Dimensionality reduction, including principle component analysis, Network analysis, Cleaning and reformatting messy datasets using regular expressions or dedicated tools such as open refine, Natural language processing, Big Data and its Ethics.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss basic concepts of data science, statistics and probability and their application in understanding behavior of data.	C2	Engineering Knowledge
CLO 2	Apply basic tools for performing exploratory data analysis and visualization.	C3	Problem Analysis
CLO 3	Demonstrate the application of basic predictive modeling and data analysis methods	C3	Lifelong Learning
CLO 4	Discuss Big Data and its Ethics.	C2	Ethics
CLO 5	Operate the software for performing different data science steps	P3	Modern tool usage

REMARKS (if any):

Recommended by: 31/8/2021
(Chairperson/Date)

Approved by:
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-212 Reservoir Fluid Properties	■ SPRING ☐ FALL	TH ☐3 ■2 ☐1 ☐0 PR☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) PE-103 Fundamentals of Petroleum Engineering	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction to reservoir fluid and its behavior

Properties of reservoir fluids, phase behavior of single and multi-component mixtures, Properties of formation waters and relevance in reservoir engineering.

Sampling

Sampling and methods of sampling of reservoir fluids. The fluids chain.

PVT analysis/experiments

PVT analysis of reservoir fluids through experiments like CCE, CVD, DE & Separator test. Petroleum Reservoir fluid types, classification and its constituents. Field observations of PVT properties. Gas- Liquid Equilibrium (Flash Calculations). Compositional analysis of petroleum reservoir fluids, examples of typical compositional data on hydrocarbons and formation water. Convergence pressure, and general low-pressure calculation

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe fluid sampling, phase behavior, PVT experiments and properties of various reservoir fluids.	C2	Engineering Knowledge
CLO 2	Carryout the computation of PVT properties.	C3	Engineering Knowledge
CLO 3	Use PVT data to provide solutions to reservoir engineering problems.	C3	Problem Analysis
CLO 4	Operate apparatus to measure the properties of reservoir fluids.	P3	Modern Tool Usage

REMARKS (if any):

Recommended by: _____ 31/8/2021

(Chairperson/Date)

Approved by: _____

(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE PE-209 Fluid Mechanics	SEMESTER ■ SPRING ☐ FALL	CREDIT HOURS TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH: 2021

COURSE CONTENTS

Fluid Properties

Properties of fluids such as density, viscosity, compressibility, surface tension and capillarity, types of fluids.

Fluid Statics

Pressure in a fluid at a point, variation of pressure with depth, Homogeneous fluid, Several fluids of different specific weights, Interconnected vessels, Rigid-body motion of fluid, Force on plane and curved surfaces, Buoyancy and flotation, Stability of a floating body.

Fluid Dynamics

System and control volume, classification of flows, velocity and acceleration fields, stream lines, path lines, and streak lines, Equation of continuity, Euler's equations of motion, Bernoulli equation, Energy equation, Impulse and momentum, One dimensional viscous flow, Flow in open channels.

Dimensional Analysis

Buckingham- Pi Theorem, Reynolds' Law of Similitude, geometrical, kinematic and, dynamic similarity and related problems.

Potential Flow

Definition, irrotational flow, stream function, application of Bernoulli's equation to irrotational flow.

Steady Flow through Pressure Conduits

General equation of friction, laminar and turbulent flow, Reynold's Number, Velocity profile in circular pipes, Nukurade's experiment- boundary layer theory including viscous sub layer: smooth, transition and fully rough pipe concepts and equations & Moody's diagram, Minor losses.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss basic fluid properties, principles of fluid statics and dynamics, types of flow and their fundamental concepts.	C2	Engineering Knowledge
CLO 2	Apply pertinent equations of fluid mechanics and solve different engineering problems based on fluid statics and dynamics.	C3	Problem Analysis
CLO 3	Analyze fluid flow in closed conduits and open channels	C4	Investigation
CLO 4	Operate apparatus for performing experiments related to fluid statics and dynamics.	P3	Modern tool usage

REMARKS (if any):

Recommended by: _____ 31/8/2021
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE PE-213 Drilling Engineering I	SEMESTER ■ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■ 1 ☐0
PREREQUISITE COURSE(S) PE-103 Fundamentals of Petroleum Engineering	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Introduction

Drilling, drilling rig, components and drill bits.

Drilling Fluids

Definition, types, functions, drilling fluid models and calculations and Environmental concerns,

Casing, Cementing and Well control

Casing design, landing and cementing practices. Well control equipment and environmental concerns. Drilling problems; stuck pipe remedial, borehole instability, recovery operation and fishing operations. Safety issues.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss Drilling engineering equipment, procedures and Testing with respect to Standard Procedures and Codes (for example API standards).	C2	The Engineers and Society
CLO 2	Carry out different drilling operations calculation	C3	Problem Analysis
CLO 3	Practice experiments to find different drilling parameters.	P3	Investigation

REMARKS (if any):

Recommended by: _____ 31/8/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
MT-331 Probability and Statistics	■ SPRING ☐ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Statistics: Introduction, Types of data & variables, presentation to data, object, classifications, Tabulation, Frequency distribution, Graphical representation, Simple & Multiple Bar diagrams, Sartorial & 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 distributions: 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, ChiSquare distribution/test, one tails & two tails tests. Application in related problems.

Probability: Basic concepts, Permutation & Combination, Definitions of probability, Laws of probability. Conditional probability, Baye's nile. 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.), Markove 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

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss the fundamental concepts in Probability and statistics	C2	Engineering Knowledge
CLO 2	Analyze data to produce mathematical or probabilistic models in relevant engineering problems.	C4	Problem Analysis

REMARKS (if any):

Recommended by: _____ 21/9/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
HS-229 Anthropology	■ SPRING ☐ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

Course Contents

Introduction: Anthropology, Fields of Anthropology, Anthropology and its relationship with other disciplines, Significance of Anthropology, Anthropological Theories

Culture: Definition, Properties and Taxonomy, Evolution of Growth and Culture, Evolution of Man, Evolution of Culture, Culture and Personality.

Culture Change: Process of Cultural Change, Cultural Change in the Modern World, Cultural Change in Pakistani society

Language and Culture: Communication, Relationship between Language and Culture.

Economic System: Global Economic System, The Allocation of Resources, The Conversion of Resources, Poverty and Inequality.

Marriage and Family: Marriage and Mate Selection, The Family: Types and Functions, Kinship System, Structure and Function of Family, Gender Relations.

Political Organization: Political Sociology, Origin of Political Organization and Organizational System, Types of Political Organizations, Power Politics and Factionalism in Pakistan, Resolution of Conflict.

Applications of Anthropology: Anthropology and Engineering

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Explain anthropology and its significance for engineering in the light of the anthropological theories	C2	The Engineer and Society
CLO 2	Discuss anthropology in relation to language, culture, family, economy and politics.	C2	The Engineer and Society
CLO 3	Apply the anthropological theories and knowledge to various engineering problems and scenario.	C3	The Engineer and Society

REMARKS (if any):

Recommended by: _____ 31/8/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
HS-230 Organizational Behavior	■ SPRING ☐ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Introduction to Organizational Behavior: Foundations of OB: Management functions, roles, and skills, Effective versus successful managerial activities, Replacing intuition with systematic study, Exploring OB challenges and opportunities facing globalization, OB Model.

Foundations of Individual Behavior: Biographical traits and ability, Personality, Perceptions and individual decision making ,Values, attitudes and job satisfaction, Motivation - basic concepts and applications, Work stress.

Foundations of Group Behavior: Group in OB: Defining and classifying groups, Stages of group development, work group behavior, Dynamics of groups, Understanding work teams, Leadership: basic approaches and contemporary issues, Conflict & negotiation

Foundations of Organizational Structure: Organizational structure and design, Organizational culture, Organization change and development.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Explain the foundations of individual and group behavior in organizational settings.	C2	The Engineer and Society
CLO 2	Discuss the role, functions, and challenges of management in the light of organizational behavior model.	C2	The Engineer and Society
CLO 3	Apply the concepts of individual and group behavior in stimulated situations to understand contemporary issues in organizational behavior.	C3	The Engineer and Society

REMARKS (if any):

Recommended by: _____ 29/8/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-314 Petroleum Production Economics	☐ SPRING ■ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Introduction

Introduction to the standards and practices of economic analysis in the petroleum industry. Brief review of the principles of economic evaluation

Economic Indicators

ROR and NPV analysis Risk Analysis Definition of risk and uncertainty, decision, analysis, decision tree analysis and estimation of future money values. Typical decision making situations including risk analysis and EMV calculations.

Reserves Estimation

Analysis involves reserve estimation

Petroleum Taxation

Petroleum taxation regulations, profitability criteria, SPE-Petroleum resource and reserve classification. Before tax cash flow models, after cash flow models. Capital budgeting techniques. Investment selection decision making

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe fundamentals of oil international trade, demand supply and market equilibrium	C2	Ethics
CLO 2	Apply methods of calculating the economic feasibility of proposed exploration, development and production project.	C3	Problem Analysis
CLO 3	Describe methods used in Petroleum Industry regarding Petroleum Resource Management System for developing Reservoir Engineer Economics skills	C2	Lifelong Learning

REMARKS (if any):

Recommended by: _____ **(Chairperson/Date)**

Approved by: _____ **(Dean/Date)**

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

F/QSP 11/17/01

Course Profile

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-315 Structural geology and Geophysical Exploration	☐ SPRING ■ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) PE-104 Applied Petroleum Geology	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction: Introduction to structural geology, Elements of map scale structure, location, structural contouring, and thickness Measurement. Fold and fault geometry, cross section, data projection & dip sequence analysis. Structure restoration and validation.

Geophysical Exploration methods: Gravity, magnetic and electrical resistivity methods, seismic refraction, and reflection methods. Seismic data acquisition and its hazards. Seismic data processing, interpretation, and pitfalls of seismic interpretations.

Geophysical/geological interpretation: General consideration of interpretation, Time depth conversion, velocity analysis, structural interpretation, contouring and faults. Seismic Stratigraphic interpretation, versatile colour display, seismic attributes, reef analysis, sand reservoir and direct hydrocarbon indicators.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe relevant theories and methods of structural geology and geophysical exploration techniques.	C2	Engineering Knowledge
CLO 2	Discuss the societal, health and legal issues related to geo-physical data acquisition.	C2	The Engineer and Society
CLO 3	Apply an appropriate set of geological and geophysical surveys to investigate a potential subsurface target.	C3	Lifelong Learning
CLO 4	Investigate the 3D structures in 2D and interpret the 2D representation of a 3D structure, along with complete description of a hydrocarbon bearing strata using geo-scientific and engineering methods	P3	Investigation

REMARKS (if any):

Recommended by: _____ 31/8/21
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-316 Subsurface Production Engineering	☐ SPRING ■ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1■0
PREREQUISITE COURSE(S) PE-103 Fundamentals of Petroleum Engineering	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH:** 2021

COURSE CONTENTS

Introduction: Introduction to Production System (onshore, offshore), Production Phases in oil & gas field operation. Surface equipment and Surface safety Control System.

Well Completion: Open hole completion, Cased hole completion, Single zone completion, multiple zone completion, and Horizontal well completion technology and operations. And its Reservoir and Mechanical considerations. Down hole completion equipment's, and its Selection Criteria.

Completion and Work over Fluids Function, requirements, selection criteria and types of fluids. Tubing design and movement calculations.

Wellbore deliverability: Uses of IPR/VLP matching to predict production rate, rate sensitivity, tubing diameter requirement and well deliverability. Different IPR methods, Gradient curves and generation of vertical lift performance curves. Choke Performance Relationship, Choke types and Flow through chokes.

Production Software: Introduction to production software and its related exercises.

Perforation: Perforation, Typesof Perforators, Evaluation of Perforators performance. Factors affecting perforating guns.

Formation Damage: Near well bore condition and Formation damage characterization.

Sand Control: Sand control, their methods, Consequences of sand production.

Wireline operations: Wire line operations, Conventional Production Rigs, Nonconventional workover systems, Concentric workover systems, well integrity during workover operation, and remedial Cementing.

HSE Considerations and Standards: HSE considerations during well operations. National & International HSE standards of Petroleum Products.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss the basics of subsurface production with operations, equipment and related problems.	C2	Engineering Knowledge
CLO 2	Carry out the IPR and OPR problems related to well performance.	C3	Problem Analysis
CLO 3	Discuss environmental issues due to production operations.	C3	Environment & Sustainability

REMARKS (if any):

Recommended by: _____ 21/8/25
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-317 Natural Gas Engineering	☐ SPRING ■ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S)	**DATE OF COURSE CONTENT APPROVAL**	**APPLIED FROM BATCH**
PE-103 Fundamentals of Petroleum Engineering	13th September 2021	2021

COURSE CONTENTS

Introduction: Properties of natural gas. Production, transportation, storage and gauging of gas. Sales gas customer requirement.

Facilities designing for gas processing: Gas field development, design of gathering systems, field treatment and processing of natural gas e.g: gas dehydration and gas sweetening. Compressors and horsepower requirements. Flow through pipelines and pressure drop. Gas hydrates, LNG, Storage of natural gas. Gas to liquids (GTL). Gas metering separator selection.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe different techniques of gas processing to meet required specifications	C2	Engineering Knowledge
CLO 2	Discuss natural gas transportation and storage facilities keeping insight the legal, societal, technical as well as environmental issues.	C2	The Engineer and Society
CLO 3	Scrutinize Natural Gas by analyzing its' properties using available data through different methods.	P3	Investigation

REMARKS (if any):

Recommended by: _____ 31/8/22
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
EL-305 Instrumentation and Control	☐ SPRING ■ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1☐0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction, instrumentation and control system terminologies. Open loop and closed loop system. Mathematical models of physical systems, transfer function, interaction and non-interactive system, development block diagrams tachometers, signal conditioning activator; Transient response of first and second order system, steady state analysis, Transportation lag, dynamic response of a gas absorber and heat exchange. Controller design, P control, I control, PID control, stability criteria, root locus method, frequency response of control system, D control (bode diagram, Nyquist diagram). Introduction to non-linear system. Simulation of control system

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Define the basics of Instrumentation and Control System.	C1	Engineering Knowledge
CLO 2	Carry out functionally check of a process control loop.	C3	Problem Analysis
CLO 3	Analyze physical systems by applying mathematical methods for analysis including stability criteria, steady state error, transient response analysis, sensitivity and root locus.	C4	Investigation
CLO 4	Investigate 1st order, 2nd Order and Higher Order complex systems and responses using Time domain Specifications and derive valid conclusions by Lab work	P3	Investigation

REMARKS (if any):

Recommended by: 31/08/2022

(Chairperson/Date)

Approved by:

(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
HS-219 Professional Ethics	☐ SPRING ■ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

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 Ethical 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, flow Charting, Conflict Problems. 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

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss the contemporary frameworks of professional and engineering ethics in the light of ethical theories and dilemmas.	C2	Ethics
CLO 2	Apply principles, theories, and codes of ethics in situations related to professional practice.	C3	Ethics
CLO 3	Value professional, aspirational, and collective ethics for continual professional development	A3	Ethics

REMARKS (if any):

Recommended by: _____ **(Chairperson/Date)**

Approved by: _____ **(Dean/Date)**

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-318 Drilling Engineering - II	■ SPRING ☐ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) PE-213 Drilling Engineering I	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Wellbore hydraulics: Design of circulation system, hydrostatic pressure in gas and liquid columns. Hydrostatic pressure in complex fluid columns. Annular pressure during well control operations. Non- static well conditions. Rheological Model (Newtonian and Non- Newtonian model). Mud hydraulics.

Casing design: Casing design procedures, collapse, burst and tension. Abnormal pressures prediction and well control. Fracture gradient prediction. Well design for safety and efficiency.

Cementation design: Types of Cement, Purpose of Cement, Cement Characterization, Cement Additives, Slurry Design, Cementation Equipment, Cementation Procedure, Cement Plug. Design of primary and secondary cementing jobs. Liner cementing, setting of cement plugs.

Bit selection: Bit selection & evaluation of wear penetrating cementing. Flow through jet bits. Jet bit nozzle selection.

Directional & horizontal drilling: Directional drilling, wellbore surveying techniques. Horizontal drilling, coiled tubing drilling. BHA design for vertical and directional wells. Torque and drag calculation, pipe buckling

Relief Wells: Applications of Relief Well, Planning, Phases, Tools (PMR, AMR), Well intersection Design Principles

Planning and budgeting: Planning, budgeting and cost control of drilling operation, tangible and intangible expenditure.

Sectorial Guidelines for drilling operations: Relevant Guidelines for Environmental Assessment Techniques Policy, Legislation, Protected Areas in Pakistan.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Outline the principles, practices and equipment for designing a directional Relief Well	C2	Engineering Knowledge
CLO 2	Outline the planning, budgeting and cost control of drilling operations.	C2	Project Management
CLO 3	Evaluate different systems of drilling operations such as casing, hydraulics, cementing etc.	C3	Investigation
CLO 4	Desire to work individually and in teams during course related tasks and exercises.	A3	Individual and Team Work
CLO 5	Operate under supervision in order to determine the Rheological properties and perform testing of different drilling fluids	P3	Modern Tool Usage

REMARKS (if any):

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(Chairperson/Date)

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NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-321 Principles of Corrosion Control	■ SPRING ☐ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) CY-109 Applied Chemistry	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction to corrosion: Corrosion and Corrosion Control Engineering

Properties of materials: The crystal structure of materials. The basic requirement and characteristics of engineering materials including ferrous and non-ferrous metals alloys, concrete, timber, ceramics and modern engineering materials.

Classification of corrosion: Corrosion losses, effect on environment, rate expression electrochemical & other aspects of corrosion form, factor influencing the corrosively of atmosphere, soil & their remedial measures. Corrosion testing, prevention & its problem to petroleum industry.

Uses of inhibitors & its types: Corrosion & its control in drilling and producing from oil & gas wells, water injection system & pipelines, sucker rods, drill pipes, casing, Controlling oil field corrosion through chemical application, catholic protection, coating & lining non-metallic material, corrosion resistant alloys, and modification of corrosion environment. Investigation of Corrosion failure, Design and Development for Corrosion protection and economic analysis using Case Studies.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss the Principles, types, procedures, mechanism and equipment related to Corrosion control engineering	C2	Engineering Knowledge
CLO 2	Discuss Corrosion control related issues with respect to environmental and sustainability concerns.	C2	Environment and Sustainability
CLO 3	Apply different engineering techniques to identify, assess and mitigate corrosion related issues.	C3	Problem Analysis
CLO 4	Discuss the engineering code of ethics and the basic moral and ethical concepts during identification, assessment and investigation of Corrosion related issues	C2	Ethics

REMARKS (if any):

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NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-322 Introduction to Unconventional Oil, Gas & Energy Resources	■ SPRING ☐ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) PE-208 Reservoir Petrophysics	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Unconventional Resources: Occurrences, resource and reservoir characteristics, drilling and completion methods, surface and subsurface facilities, reservoir management, technical, economic, political, and environmental limitations on development of unconventional resources (Tight sands, coal bed gas, shale reservoirs, heavy oil and gas hydrates).

Naturally fractured reservoir: Naturalfractures; importance in unconventional reservoirs, origin, occurrence, and predictability. Fracture effects on hydrocarbon storage, porosity, and permeability, permeability anisotropy and coning. Breakthrough and boundaries roles in exploration. Roles in reservoir management; primary and enhanced recovery. In-situ stresses; Classification of fractured reservoirs.

Gas storage: Types and locations of gas storage reservoirs, technical issues and terminology. Gas storage volumes and economics. CO_2 Storage.

Other unconventional energy resources: Geothermal energy, Coal conversion to Gas, Coal-to-gas and In-situ gasification.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss the fundamentals of different unconventional energy resources	C2	Engineering Knowledge
CLO 2	Discuss the techniques and associated challenges related to development/management of unconventional resources.	C2	Environment and Sustainability
CLO 3	Apply the analytical and numerical techniques to solve the development/management issues of an unconventional resource	C3	Problem Analysis
CLO 4	Discuss the engineering code of ethics and the basic moral and ethical concepts during the exploitation and development of an unconventional energy resource.	C2	Ethics

REMARKS (if any):

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NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-323 Renewable Energy I	■ SPRING ☐ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction to renewable Energy: Introduction to renewable energy and its types, History and in practice renewable energy technologies around globe.

Solar Energy: Comparative analysis of Solar Energy harnessing types, advantages and disadvantages of Solar Energy.

Wind Energy: Wind energy Resource assessment, Wind mills and their types, Environmental effects

Hydropower: Classification of Hydropower energy sources, working and efficiency of Turbines, environmental effects.

Biomass: Biomass sources, solid wastes, gasification process, environmental issues.

Geothermal: Types of Geothermal energies, environmental issues.

Energy Storage Devices: Fuel cells, Batteries, Mechanical devices and Thermal devices.

Other renewable energies: Brief Introduction about ocean and nuclear energies.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe renewable energy and its different types	C2	Engineering Knowledge
CLO 2	Describe knowledge of Environment and safety issues related with renewable energy types	C2	Environment and Sustainability
CLO 3	Interpret renewable energy resource assessment calculations	C3	Problem Analysis
CLO 4	Discuss principles of ethics in situations related to Environment and safety issues	C2	Ethics

REMARKS (if any):

Recommended by: 31/8/2022

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NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-319 Reservoir Engineering - I	■ SPRING ☐ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) PE-208 Reservoir Petrophysics	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction: Reservoir drive mechanisms, Fluid Pressure regimes

Reserves estimation: Volumetric Estimation of Hydrocarbons Initially in Place (HCIIP). Material Balance Equation, Material Balance equation as a straight line and its applications, Reservoir Drive Indices

Fluid flow behavior: Darcy law of fluid flow system and well performance/productivity index. Modes of well operation and general pressure dynamics. Time to reach minimum bottom hole pressure and saturation pressure paths, two Phase flow with effective and relative permeability concepts, the basic differential flow equation in porous medium

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss the fundamentals of reservoir engineering	C2	Engineering Knowledge
CLO 2	Derive and apply oil and gas material balance under various reservoir conditions for in-place and reserves estimation.	C3	Design/ Development of Solutions
CLO 3	Solve for the rates and recoveries of oil and gas reservoir through volumetric, material balance and decline curve analysis.	C3	Problem Analysis
CLO 4	Operate software for total recoveries and split in the form of various drive indices.	P3	Modern Tool Usage

REMARKS (if any):

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NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-320 Fundamentals of Well Logging	■ SPRING ☐ FALL	TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) PE-208 Reservoir Petrophysics	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction: Display of well-log data and graphical conventions, wellbore environment, the physics of mud-filtrate invasion.

Types of logs and its applications: Principle and applications of: temperature logging, caliper logging, gamma-ray logging, spontaneous potential (SP) logging, density logging and litho-density logs, neutron logging, resistivity logging and sonic logging. Modern resistivity logging tools. Joint interpretation of density and neutron log measurements. Well logs interpretation. Cased Hole logging and production Logging. Group activities related to interpretation of real-world well logs and reporting results.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss essentials of wire-line logging (Principle of measurements, tool, effects of logging environment, Quantitative and Qualitative uses of logs, Log Characteristics).	C2	Engineering Knowledge
CLO 2	Carry out Interpretation on well logs.	P3	Investigation
CLO 3	Desire to work individually and in teams during course related tasks and exercises.	A3	Individual and Team Work
CLO 4	Exhibit reporting skills during course related tasks and exercises.	A3	Communication

REMARKS (if any):

Recommended by: 31/8/2022

(Chairperson/Date)

Approved by:

(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE MT-471 Applied Numerical Methods	SEMESTER ■ SPRING ☐ FALL	CREDIT HOURS TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH: 2021

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.

Linear Operators: Functions of operators, difference operates and the derivative operators, identities.

Difference Equations: Linear homogenous and non-homogenous difference equations.

Solution of Nonlinear Equations: Numerical methods for finding the roots of transcendental and polynomial equations (Secant, Newton – Raphson, Chebyshev and Giraffe's root, squaring methods), rate of convergence and stability of an iterative method.

Solution of Linear equations: Numerical methods for finding the solutions of system of linear equations (Gauss-Eliminations, Gauss-Jordan Elimination, triangularization, Cholesky, Jacobi and Gauss-Seidel).

Interpolation & Curve Fitting: Lagrange's Newton, Hermit, Spline least approximation (Linear and non-linear curves).

Numerical Integration & Differentiation: Computation of integrals using simple Trapezoidal rule, 1/3th Simpson's rule, 3/8th Simpson's rule. Composite Simpson's and Trapezoidal rule, computation of solutions of differential equations using (Euler method, Euler modified method Range Kutta method of order 4),

Linear programming: Formulating problems, linear programming models, graphical methods simplex method.

Improper Integrals: Definitions, types of improper integrals and their convergence.

Elliptic Integrals: Introduction and identification of elementary elliptic integrals of first, second and third kinds. Simple applications.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Explain numerical method to solve the system of linear equations and non-linear equations.	Cognitive C2	PLO-2 Problem Analysis
CLO 2	Apply numerical differentiation and numerical integration in relevant engineering problems.	Cognitive C3	PLO-1 Engineering Knowledge
CLO-3	Perform computer algorithm of numerical methods to solve relevant engineering problems.	Psychomotor P3	PLO-2 Problem Analysis

REMARKS (if any):

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NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE PE-415 Reservoir Simulation	SEMESTER ☐ SPRING ■ FALL	CREDIT HOURS TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) PE-319 Reservoir Engineering-I	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH 2021

COURSE CONTENTS

Introduction: Basic theory and practice in reservoir simulation. Introduction to the finite difference methods and solution techniques. Time stepping, analysis of accuracy, convergence and stability and discretization.

Numerical Simulation: Numerical schemes for solving sparse matrix equation. Flow simulation using field data. Reservoir model; up-scaling. Treatment of wells in reservoir flow simulation.

Computer Modeling: Interpreting flow simulation results and history matching. Various techniques for developing black-oil, compositional, thermal and dual-porosity models. Fracture reservoir simulation.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe the basic concepts of reservoir simulation.	C2	Engineering Knowledge
CLO 2	Solve reservoir fluid flow partial differential equations numerically.	C3	Problem Analysis
CLO 3	Develop reservoir simulation Data Files.	C5	Design / Development of Solutions
CLO 4	Practice for simulation outputs through relevant reservoir simulation software.	P3	Modern Tool Usage
CLO 5	Express self-reliance in group or individual discussion.	A3	Individual and Team Work

REMARKS (if any):

Recommended by: _____ 31/8/2022

(Chairperson/Date)

Approved by: _____

(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE PE-416 Reservoir Engineering-II	SEMESTER ☐ SPRING ■ FALL	CREDIT HOURS TH ☐3 ■2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) PE-319 Reservoir Engineering-I	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH 2021

COURSE CONTENTS

Water influx modeling: Aquifer definition, classification and properties, Water influx theory and models; Steady and Unsteady state for finite and infinite aquifers.

Material balance and recovery strategies: Estimating oil well rates under different drives mechanisms, Volatile oil MBE, Calculation of original gas and condensate in place for volumetric gas condensate and volatile oil reservoirs, reserves calculations with and without compositional data. Case histories.

Reservoir Engineering Development & Management: A review of physical properties, geology, technology, economical limitations, etc. for development and management of a particular field. Study of various optimization strategies applicable to field development. Case histories.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe the main concepts and techniques related to water aquifer classifications and modeling for different types of reservoirs.	C2	Engineering Knowledge
CLO 2	Apply reservoir engineering techniques to solve the reservoir development and production problems that occurred in the different drive mechanism.	C3	Problem Analysis
CLO 3	Analyze the data related to reservoir engineering.	C4	Lifelong Learning
CLO 4	Design a reservoir development plan case studies.	C5	Design/development of solution
CLO 5	Investigate key parameters related to reservoir development using numerical and analytical techniques by using software.	P3	Modern Tool Usage

REMARKS (if any):

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Approved by: _____ **(Dean/Date)**

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE CS-323 Artificial Intelligence	**SEMESTER** ☐ SPRING ■ FALL	**CREDIT HOURS** TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) PE-211 Introduction to Data Sciences	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction to AI, Computational Intelligence, Searching Methodologies, First-Order-Logic, Evolutionary Computing: Genetic Algorithms, Evolutionary Strategies, Biology-Inspired Models; Knowledge Representation: Semantic Networks, Frames and Scripts; Reasoning with Imperfect Knowledge, Rule-Based Systems: Modeling, Reasoning Strategies, Conflict Resolution and Rule Matching; Artificial Neural Networks; Vague Notions in Knowledge-Based Systems: Models based on Fuzzy Set Theory; Game Theory, Prospects of Artificial Intelligence.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Explore contemporary techniques of artificial intelligence.	C3	Engineering Knowledge
CLO 2	Solve problems using artificial intelligence techniques.	C3	Design / Development of Solutions
CLO 3	Demonstrate the use of modern tools and techniques for developing intelligent systems (Lab work only).	C3	Modern Tool Usage

REMARKS (if any):

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(Chairperson/Date)

Approved by:
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NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE PE-423 Petroleum Refinery Engineering	SEMESTER ☐ SPRING ■ FALL	CREDIT HOURS TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	DATE OF COURSE CONTENT APPROVAL 13th September 2021	APPLIED FROM BATCH 2021

COURSE CONTENTS

Introduction: Introduction to Petroleum Refinery, overall refinery flow, refinery feed-stocks and products analysis.
Refinery Processes: Desalting, Crude distillations (atmospheric & vacuum), coking catalytic reforming and isomerization, catalytic cracking, hydrogenating, catalytic hydro cracking and hydro processing. Refinery Units Case Studies.
Refinery Products: Product blending, supporting process and petrochemicals.
HSE Practices in Petroleum Refineries: Hazards in Refinery Units, Safety Programs and Regulations, Management and Assessment. Wastes in Refinery Units, Waste Management (Gas Waste, Wastewater, and Solid Waste)
Refinery Economics: Cost estimation and economic evaluation of refinery investment.
Corrosion: Corrosion, types and testing, prevention & its problem to petroleum refinery industry.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe ASTM standards, procedures used in the Petroleum refinery industry regarding products, unit operations for developing downstream interest.	C2	Lifelong Learning
CLO 2	Discuss the HSE Practices in Petroleum refineries including hazards in refinery units, safety programs and regulation, management and assessment, and waste management.	C3	Environmental and sustainability
CLO 3	Solve problems related to refinery engineering processes.	C3	Problem Analysis
CLO 4	Operate different equipment's to measure properties related with petroleum products.	P3	Modern tool Usage

REMARKS (if any):

Recommended by: 31/8/2021 (Chairperson/Date)

Approved by: (Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-424 Renewable Energy II	☐ SPRING ■ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) PE-323 Renewable Energy-I	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Solar Energy: Types of collectors, calculation of collector overall heat loss coefficient, heat removal factor and flow factor, determining mean fluid and plate temperature. Calculation of heat capacity effects on flat-plate collectors and design of solar heating system, design of concentrated collectors, and performance analysis, solar process economics, cost of solar process systems and life cycle savings methods.

Wind Energy: General characteristics of wind resources, wind data analysis and resource estimation, wind turbine energy production estimation methods, wind measurement and instrumentation, principle of wind turbine, components and their functions, spacing of the towers, horizontal axis versus vertical axis wind turbines, blade design, momentum and blade element theory, stresses due to Blade Weight and centrifugal force, blade natural frequencies, blade shape for ideal rotor. Rotor design, basic rotor parameters, blade shape, rotor performance. Environmental risks associated with wind energy

Hydropower Energy: General introduction: hydropower potential, concept of modern hydro power plant, location /site selection, plant layout, power plant safety reservoir, dams & tunnels etc. Constructional details and basic principles of hydro-mechanical equipment, hydrology & hydroelectric power plants, hydrographs – flow duration curve – mass curve & storage. Site selection for hydroelectric power plants. Construction and working principles of various types of valves and pumps and hydraulic system. Construction and working principles of alternators and excitation systems, transformers, motors, switchgears. Turbine selection criteria, site selection and feasibility study.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe different criteria for the selection of appropriate renewable energy resource	C2	Life-long learning
CLO 2	Discuss environmental issues due to renewable energy operations	C3	Environmental and sustainability
CLO 3	Carry out calculations related to design specifications for each renewable energy resource	C3	Problem Analysis
CLO 4	Operate software under supervision for the construction of components associated with each renewable energy resource	P3	Modern Tool Usage

REMARKS (if any):

Recommended by: 31/8/2022 **Approved by:**

(Chairperson/Date) **(Dean/Date)**

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-417 Project Planning & Management	☐ SPRING ■ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction: Overview of project management; project, program, portfolio; Enterprise Environmental Factors; Organization process asset; project manager roles.

Project integration management: Project charter and Project management plan; Managing Project work and knowledge; Performance of integrated change control; Project or phase closure.

Project scope management: Scope planning, definition, validation and control; work breakdown structure.

Project schedule management: Schedule management definition and planning; project activities sequencing and duration estimation; schedule development and control.

Project cost management: Project and project activities cost planning, estimation, budgeting and control.

Project quality management: Project quality planning, management, and control.

Project resource management: Project and project activities resource planning, estimation, acquirement, and control. Developing and Managing Team.

Project communication management: Project communication planning, management and control.

Project risk management: Risk management planning; risk identification and analysis; planning and implementation of risk response; monitoring of risk.

Project procurement management: Planning of procurement management; procurement process and control.

Project stakeholder management: Stakeholder identification; planning, managing and monitoring stakeholder engagement.

Implementation of project activities using software.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss different management skills required in project execution	C2	Engineering Knowledge
CLO 2	Carryout different project tasks.	C3	Project Management
CLO 3	Apply project management tools and skills to execute different task and activities for successful project completion.	C3	Life-long learning
CLO 4	Desire to work individually and in teams during course related tasks and exercises.	A3	Individual and Team Work
CLO 5	Exhibit communication skills during course related tasks and exercises.	A3	Communication

REMARKS (if any):

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Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-418 Oil and Gas Field Production Facilities	■ SPRING ☐ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) PE-316 Subsurface Production Engineering	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Production optimization (nodal analysis): Process Control, Flow control, pressure control, level control, temperature control, and safety shut down and pressure relief.

Well stimulation: Hydraulic fracturing and matrix acidizing. Modeling; propagation models, 2D, Pseudo 3D, PKN, GDK.

Produced water treatment: Skimmer tanks. Coalesces, hydro cyclones, flotation cells, disposal piles and injection wells. Tanks; volume and construction, final separation and vapor recovery options and emissions (flash calculations). Surface separation operations including types, application and design of two and three phase separators.

Artificial lift methods: Artificial lift methods and applications including gas-lift, electrical submersible pumping, and sucker rod pumping. Types of installation and design.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss the methods, tools and designing parameters required for production systems.	C2	Engineering Knowledge
CLO 2	Discuss environmental sensitive issue in production engineering practice	C2	Environment and Sustainability
CLO 3	Apply project planning and management skills on an enhanced oil recovery project.	C3	Project Management
CLO 4	Practice for the solution in Production system problems.	P3	Modern Tool Usage

REMARKS (if any):

Recommended by: _____ 31/8/2022

(Chairperson/Date)

Approved by: _____

(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-419 Water Flooding and Enhanced Oil Recovery	■ SPRING ☐ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) PE-319 Reservoir Engineering-I	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Water-flooding: Mobility ratios, displacement efficiency, sweep efficiency, factors to consider in water flooding, optimum time to water flood, performance predictions using fractional flow and frontal advance equations and water sources. Oil displacement by water in a layered reservoir using Dykstra-Parson´s method.

Introduction to Enhanced oil recovery (EOR): Introduction and Overview of EOR methods and EOR status worldwide. Basic petro-physical properties; Permeability/porosity, Relative permeability, capillary pressure and residual oil saturation.

Polymer flooding: Polymers, polymer properties and rheology, fractional flow and laboratory results. Field projects.

Surfactant flooding: Surfactants, surfactant-brine-oil phase behavior, surfactant solution properties, trapped oil and oil mobilization. Relative permeability and capillary pressure and laboratory results. Field projects.

Alkaline flooding: Laboratory screening, soap generation and phase behavior. Laboratory tests, field examples.

Conformance control Methods: Bulk gels, micro gels, foam, field projects.

Gas flooding: Immiscible and Miscible gas injection. CO2 properties. Phase diagrams, continuous, slug and WAG injection. Relative permeability models. Field examples.

Thermal methods: Steam flooding, cyclic and continuous steam injection. Thermal properties of rock and fluids. Effect of temperature on fluid and rock properties. SAGD. In situ combustion and evaluation of heat losses. Field examples.

EOR simulators: Overview of commercial simulators for EOR methods.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Describe relevant theories, models along with appropriate applications of Water Flooding and Enhanced Oil Recovery Method.	C2	Engineering Knowledge
CLO 2	Apply project planning and management skills on an enhanced oil recovery project.	C3	Project Management
CLO 3	Design and develop a petroleum field for enhanced oil recovery.	C5	Design/Development of Solutions
CLO 4	Investigate key parameters related to the development of water flooding and Enhanced Oil Recovery processes using relevant procedures.	P3	Investigation

REMARKS (if any):

Recommended by: _____ 31/8/2022
(Chairperson/Date)

Approved by: _____
(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-421 Well Testing	■ SPRING ☐ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ■1 ☐0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction: Objectives of well tests. Transient, steady state, pseudo steady state flow, wellbore storage and radius of investigation concept.

Pressure Transient Testing: Theory, graphical representation and interpretation of pressure draw down and build-up tests. Modification of the diffusivity equation for gas. Application of pseudo-pressure function, pressure square and pressure methods for analysis of gas well tests. Type curve matching. Superposition principle and pressure derivatives. Analysis of well tests affected by phase redistribution. Theory of injection, fall off, interference and pulse testing. Well testing of hydraulically fractured and naturally fractured Wells. Drill stem testing and analysis.

Gas well Deliverability Testing: Theory, graphical representation and interpretation of Flow-after flow, isochronal and modified isochronal tests. Design and implementation of well tests.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss the essentials related to pressure transient and well deliverability test.	C2	Engineering Knowledge
CLO 2	Develop mathematical models for the analysis of various well tests scenarios.	C5	Design/Development of Solutions
CLO 3	Carry out Interpretation on well test data.	C3	Investigation
CLO 4	Investigate well test data to infer well and reservoir parameter.	P3	Investigation

REMARKS (if any):

Recommended by: _____ 31/8/2022

(Chairperson/Date)

Approved by: _____

(Dean/Date)

NED University of Engineering and Technology

Department of Petroleum Engineering

Program Bachelor in Petroleum Engineering

Course Profile

F/QSP 11/17/01

COURSE CODE& TITLE	SEMESTER	CREDIT HOURS
PE-422 Petroleum Property, Environment & Safety Management	■ SPRING ☐ FALL	TH ■3 ☐2 ☐1 ☐0 PR ☐3 ☐2 ☐1 ■0
PREREQUISITE COURSE(S) N/A	**DATE OF COURSE CONTENT APPROVAL** 13th September 2021	**APPLIED FROM BATCH** 2021

COURSE CONTENTS

Introduction to HSE: Basic definitions, General Policies, Rules, Regulations, laws and standards related to health, safety and environment.

Health and Safety: Organization and Promotion of health and safety culture, Types of hazards, risk assessment, principles of risk control, Communication of Hazards, Fire and its safety, Work Permits, Emergency preparedness, First Aid, Audit procedure and reporting, Accident and incident investigation procedure and reporting and major accidents case studies.

Environmental Problems: Environment pollution, Air emission management, Waste management, Waste water treatment and control, Soil and ground water protection Environmental hazards of different activities of petroleum industry their remedial procedures.

HSE related Project and activities.

COURSE LEARNING OUTCOME AND ITS MAPPING WITH PROGRAMME LEARNING OUTCOME

Sr. No.	CLOs	Taxonomy level	Programme learning outcome (PLO)
At the end of the course, the student will be able to:			
CLO 1	Discuss HSE related concepts and information to make society safe.	C2	The Engineer and Society
CLO 2	Discuss ethical considerations of occupational health and safety at workplace.	C2	Ethics
CLO 3	Discuss Environmental issues and sustainability.	C2	Environment and Sustainability
CLO 4	Carryout HSE related projects	C3	Project Management
CLO 5	Exhibit communication skills during course related tasks and exercises.	A3	Communication

REMARKS (if any):

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(Chairperson/Date)

Approved by: _____

(Dean/Date)