NED University of Engineering & Technology
Department of Petroleum Engineering

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 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.

a. 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.

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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				✓

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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
					HSK-I/HS-231	Chinese Language / Turkish Language Course-I	NC		
	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
HSK-II/HS-232	Chinese Language / Turkish Language Course-II	NC							
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					
	Total	**15**	**2**	**17**		**Total**	**12**	**4**	**16**

Final Year

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
	Total	**11**	**6**	**17**		**Total**	**12**	**6**	**18**

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

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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

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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
		HSK-I/HS-231 Chinese Language												
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												
		HSK-II Chinese Language												
		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						

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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				C2
		PE-315 Structural Geology & Geophysical Exploration	C2			P3		C2						C3
		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												
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							C4
		PE-423/ CS-323/ PE-424 Elective II												
		PE-417 Project Planning & Management	C2								A3	A3	C3	C3
	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.

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