Outcome 4. The graduates will have the ability to use techniques, skills and modern petroleum & natural gas engineering tools.

The assessment is performed with respect to the key abilities that the students are expected to acquire in specific courses that have been identified with respect to this outcome.

Course	Key abilities	Performance indicators
PNGE 310	Application of techniques, and tools necessary for solving drilling engineering problems.	Utilize various software for solving drilling engineering problems
PNGE 420	Application of techniques, and tools necessary for solving production engineering problems.	Utilize various software for solving production engineering problems
PNGE 332	Gas-liquid equilibrium calculations	Perform simulation for flash liberation test, differential liberation test and separator test.
PNGE 333	Use of software to analyze data and prepare graphs, tables and reports	Effectively analyze the data and present the results of their analysis.
PNGE 441	Use of software to analyze data	Perform reservoir forecasting and economic evaluation.

Tools used: Course-embedded assessment, Program-level composite assessment scores, Graduating student survey

Note: The faculty/instructors in all PNGE courses evaluate the student performance relative to the "Performance Indicators" based on different assignments such as homework, exams, projects, reports, etc. The score for each student outcome is then determined by the instructor according to the combination of the different assignments.

Data Collection: The data are collected every semester based on the course offerings.

Frequency of data collection:	The data are collected every time courses are taught.
Data Analysis:	The data obtained are analyzed every year.
Closing the loop:	This outcome is subject to review every year based on performance criteria and metrics. The analyzed data are presented to faculty and specific action items are developed, if necessary, to revise the content of the courses.

Performance criteria:

a) The students must demonstrate the ability to modern techniques and tools for solving problems as related to the key abilities in specific courses.

Metrics:

a) An overall score of 80% based on the Program-level composite assessment score and the Graduating student survey results.

Assessment Tool:

Program-level composite assessment scores

Program-level composite assessment scores

The scores on each outcome from various PNGE courses are utilized to determine a composite score for each outcome. The composite scores are determined based on the weight percentage given in Table below:

Weight Percentages for Determining the Program-level Composite Scores

Course	1	2	3	4	5	6	7	8	9	10	11
	a	b	e	k	c	g	d	f	h	j	i
PNGE 332	25	15		25		20					
PNGE 310				25	20	20			30		
PNGE 312		15				20					
PNGE 333	25		20	25	20						
PNGE 400								70			
PNGE 405							100				30
PNGE 420			20	25	20				40	30	40
PNGE 432		15				20					
PNGE 434	25	10			20					40	
PNGE 441		15	20								
PNGE 450		15	20			20		30	30	30	
PNGE 470	25	15	20		20						30
TOTAL	100	100	100	100	100	100	100	100	100	100	100

Assessment Tool:

Graduating student survey

SENIOR EXIT SURVEY

Graduation Date		
Degree		
Minor		
Date you began your education at WVU		
Previous University(s) if transfer student		
Plans after graduation:	Accepted position with	Starting Salary
	Attending graduate school (MS or Ph.D.)	Field of study
	Seeking employment	Primary area of interest
Do you plan to become a registered professional engineer? (Y or N)		
When did you take the FE Exam? (Y or N)		
Do you plan to pursue an advanced degree someday? (Y or N)		
If yes, in what discipline?		
Are you a member of the SPE? (Y or N)		

PART I	**Assessment of student outcomes**
	A graduate of any ABET accredited engineering program must be able to
1a	apply knowledge of mathematics, science and engineering
1b	design and conduct experiments, analyze and interpret data
1c	design a system, component or process to meet needs
1d	function on a multi-disciplinary team
1e	identify, formulate and solve engineering problems
1f	understand professional and ethical responsibility
1g	communicate effectively
1h	know the impact of engineering in a global/societal context
1i	recognize the need for, and engage in life-long learning
1j	know about contemporary issues
1k	use techniques, skills and modern tools in engineering
2l	mathematics through differential equations
2m	probability and statistics

2n	fluid mechanics
2o	strength of materials
2p	thermodynamics
2q	design and analysis of well systems
2r	procedures for drilling and completing wells
2s	characterization and evaluation of subsurface geological formations and their resources using geoscientific and engineering methods
2t	design and analysis of systems for producing, injecting and handling fluids
2u	application of reservoir engineering principles and practices for optimizing resource development and management
2v	design and decision making under conditions of risk and uncertainty
PART II	**Assessment of elements related to the educational environment**
	Please rate the following components of the educational environment at WVU
1	availability, quality, and quantity of computing facilities in the department
2	availability, quality, and quantity of computing facilities at the college
3	quality of classrooms
4	quality of chemistry laboratories
5	quality of the physics laboratories
6	quality of the PVT laboratory
7	quality of reservoir engineering laboratory
8	quality of the drilling fluids laboratory
9	quality of the natural gas laboratory
10	quality of the library facilities
11	quality of the PNGE library collection
12	quality of the academic advising you received
13	quality of the pre-registration process
14	quality of the registration process
15	quality of the career advising and placement services
16	quality of career advising you received from the Department

17	support received from the PNGE faculty
18	accessibility of the PNGE faculty
19	competency of the PNGE faculty
20	support received from the Chair of the PNGE Dept.
21	accessibility of the Chair of the PNGE Dept.
22	quality of service provided by the Dept. secretary
23	quality of freshman year experience
24	quality of GEC electives
25	quality of the mathematics courses
26	quality of the chemistry courses
27	quality of the geology courses
28	quality of the engineering (excluding PNGE) courses
29	quality of physics courses
PART III	**Assessment of educational outcomes related to the Petroleum & Natural Gas**
	Please rate the followings
1	The PNGE program provided me with a fundamental knowledge of petroleum engineering in the areas of drilling, production and reservoir engineering.
2	The PNGE program provides students with opportunities throughout the curriculum to develop, written and oral communication skills as well as computational skills as they relate to both technical and non-technical material.
3	The PNGE program provided me with an integrated design experience beginning with exposure and exercises in freshman-level courses leading to a senior design experience.
4	The senior design course provided a culminating experience based on the knowledge and skills acquired in earlier course work and incorporating engineering standards and realistic constraints that include most of the following considerations: economics, environmental,..
5	The PNGE program provided me with a recognition and understanding of the professional and societal responsibilities associated with being a petroleum engineer.

6	The PNGE program provided me with an environment in which I could address global and multi-cultural issues, investigate models and social behavior and leadership, sharpen my aesthetic sense and embrace my own social and personal development
7	My education at West Virginia University adequately prepared me to function on multi-disciplinary teams.
8	My education has adequately prepared me for my profession
Is there anything else you would like to say about your education at West Virginia University?	
Is there anything else you would recommend that we can do to improve the PNGE program?	