

**Department of Polymer & Petrochemical Engineering (PPD)**  
**NED University of Engineering & Technology (NED UET)**  
**Introduction to Outcome Based Education (OBE) for students**

(In line with Pakistan Engineering Council (PEC) accreditation manual 2014)



**Pakistan Engineering Council**  
Regulating the Engineering Profession

PEC is a statutory body to regulate the engineering profession including quality of education in Pakistan. Accreditation by PEC is mandatory for you to get HEC attested engineering degree in Pakistan.



The Washington Accord, originally signed in 1989, is an international accreditation agreement for professional engineering academic degrees signed between bodies responsible for accreditation in its signatory countries. PEC became a full-signatory member of The Washington Accord on June 21, 2017.

### **What Does It All Mean to Engineering Students?**

If a student degree program is accredited on the Outcome-Based Education (OBE) system of The Washington Accord then you can easily go and study or work in any of the signatory countries without having clear any competitive or equivalence examination.

### **What is Outcome Based Education (OBE)?**

Outcomes based education is a student-centered teaching and learning methodology to education that focuses on what a student should be able to do in the real world upon completion of their course or program.

It focuses on measuring student performance that is outcomes at different levels e.g. At the end of each course.

The main goal of OBE is to bridge education and employability.

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*Sequences of steps in OBE are as follows;*

- Identify the outcomes of the degree program
- The curriculum is designed based on the identified outcomes
- Classroom and Laboratory instructions and assessments are developed to achieve these outcomes
- Relationship between curriculum design and employability is evaluated.

*Benefits of OBE:*

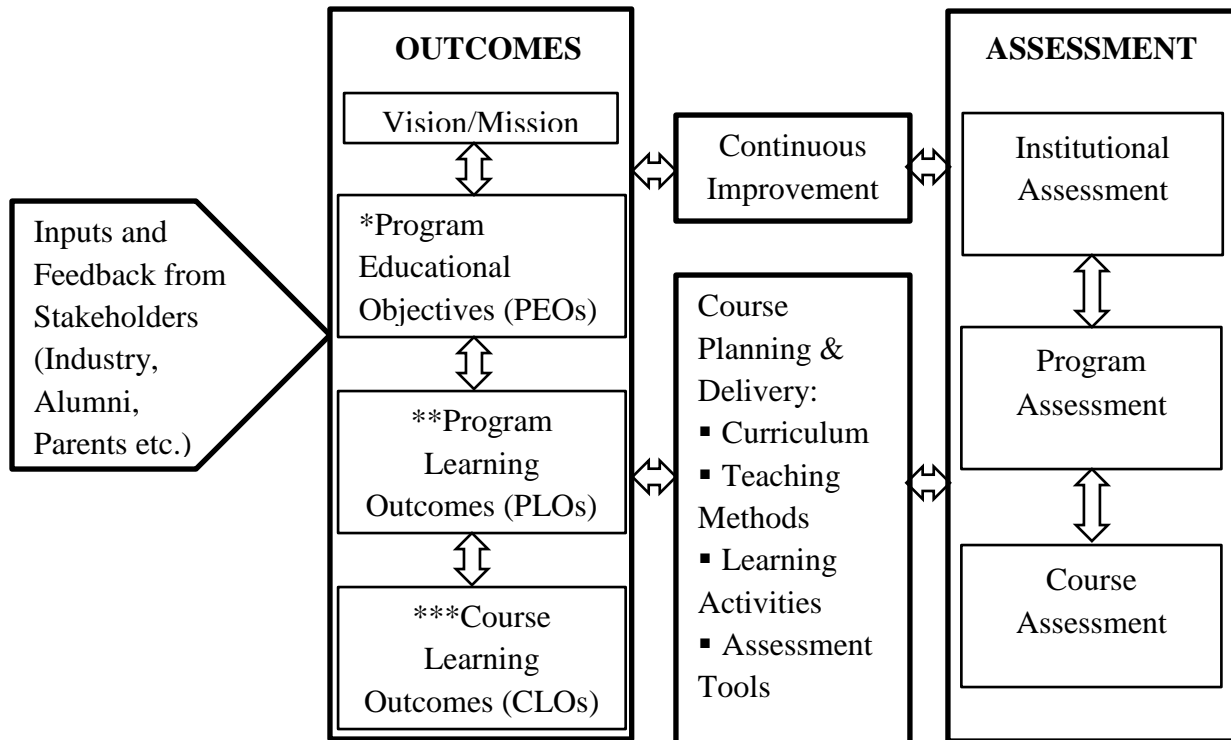
- Provide a strategic way to enhance the quality of teaching and learning;
- Prepare students for the “rest-of-life” context in which they will need to apply what they have learned in their course/program;
- provide a framework to align teaching, learning and assessment methods;
- Promote a collaborative, collegial approach to curriculum planning;
- Help to ensure the approval and accreditation of new and existing programs;
- Provide a mechanism for ensuring accountability and quality assurance;
- Promote a self-directed and autonomous approach to learning;
- Provide a means for students to articulate the knowledge, skills, attitudes and experience acquired during their program;
- Provide a tool for monitoring, evaluating and improving the curriculum; and
- Help to encourage continuity and mobility between varying post-secondary programs and institutions.

**What are the Benefits of OBE to Students?**

- Clarity: Students will understand what is expected from them and teachers will know what they need to teach during the course.
- Pliability: OBE is meant to be a student-centered learning methodology. Teachers are meant to facilitate and help the students in understanding the learning material in various ways.
- Participation: Students participation is the key part of OBE. Students are expected to do their own learning, so that they gain a full understanding of the material.
- Employment Opportunities: Under the umbrella of The Washington Accord the students get equivalence of accredited professional degrees offered by the signatory countries. Thus accredited engineering graduates through this accord will have the freedom to work in any signatory countries (e.g. USA, UK, New Zealand etc.) without any equivalence examination.

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**The OBE Framework**



**\*Program Educational Outcomes (PEOs):** The statements that describe the expected achievements of graduates in their career, and also in particular, what the graduates are expected to perform and achieve during the first few years after graduation.

**\*\*Program Learning Outcomes (PLOs):** The narrower statements that describe what students are expected to know (graduate attributes (GA)) and be able to do by the time of graduation.

**\*\*\*Course Learning Outcomes (CLOs):** Course Learning Outcomes describe the complex performances a student should be capable of as a result of learning experiences within a course.

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**Vision of the NED University of Engineering & Technology**

“be a leader in enabling Pakistan's social and economic transformation”.

**Mission of the NED University of Engineering & Technology**

“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”.

**Vision of the Faculty of Chemical and Process Engineering**

Our faculty strives to “to produce engineers with sound engineering knowledge capable of serving in challenging environments”.

**Vision of the Department of Polymer & Petrochemical Engineering**

To become a leading institute of national and international repute in the field of Polymer & Petrochemical engineering and exceptionally contribute to solve the technological needs of the global economy and human society.

**Mission of the Department of Polymer & Petrochemical Engineering**

The Polymer & Petrochemical Engineering Department is dedicated “to produce professional engineers equipped with theoretical and practical knowledge and skills enabling them to ethically lead and contribute in the constant growth of the knowledge-base and sustainable improvement in the polymer and petrochemical industries, nationally and internationally”.

**Program Educational Outcomes (PEOs) of PPD:**

**PEO-1:** Demonstrate strong competence in Polymer & Petrochemical Engineering discipline resulting in a dynamic professional career.

**PEO-2:** Exhibit strong leadership, management, and communication skills in multi-disciplinary environments.

**PEO-3:** Manifest engineering ethics while addressing societal, environmental, and global technical and non-technical problems.

**PEO-4:** Engage in life-long learning, research, and innovation over the career.

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**Program Learning Outcomes (PLOs)**

The twelve graduate attributes have been adopted, provided in Manual of Accreditation 2014 as Program Learning Outcomes (PLOs) for bachelors in Polymer & Petrochemical Engineering program.

- 1. Engineering Knowledge:** An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
- 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.
- 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.
- 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.
- 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.
- 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 responsibilities relevant to professional engineering practice and solution to complex engineering problems.
- 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.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
- 9. Individual and Team Work:** An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.

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**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.

**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.

**12. Lifelong Learning:** Ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

**Mapping of PLOs with PEOs**

<b>PEOs</b>  →	<b>PEO-1:</b> Demonstrate strong competence in Polymer & Petrochemical Engineering discipline resulting in a dynamic professional career			
	<b>PEO-2:</b> Exhibit strong leadership, management, and communication skills in multi-disciplinary environments			
	<b>PEO-3:</b> Manifest engineering ethics while addressing societal, environmental, and global technical and non-technical problems			
	<b>PEO-4:</b> Engage in life-long learning, research, and innovation over the career			
<b>PLOs</b>  ↓	<b>PEO-1</b>	<b>PEO-2</b>	<b>PEO-3</b>	<b>PEO-4</b>
<b>Engineering Knowledge</b>	✓			
<b>Problem Analysis</b>	✓			
<b>Design/Development of Solutions</b>	✓			
<b>Investigation</b>	✓			
<b>Modern Tool Usage</b>	✓			
<b>The Engineer and Society</b>			✓	
<b>Environment and Sustainability</b>			✓	
<b>Ethics</b>			✓	
<b>Individual and Team Work</b>		✓		
<b>Communication</b>		✓		
<b>Project Management</b>		✓		
<b>Lifelong Learning</b>				✓