PEER GROUP LEARNING (PGL) METHODOLOGY

1. Purpose

Peer Group Learning is implemented to promote collaborative, student-centered learning in the context of complex chemical processes. It supports Outcome Based Education (OBE) by encouraging students to discuss and master technical topics like refinery operations and polymer science, thereby improving learning outcomes.

2. Scope

This procedure applies to:

- Undergraduate and postgraduate programs in Petrochemical Technology.
- Both theory subjects (e.g., Thermodynamics) and laboratory courses (e.g., Petroleum Testing Lab).
- All students and faculty within the department.

3. Procedural Steps (Petrochemical Adaptation)

Step 1: Identification of Topics

Identify Petrochemical topics that require:

- Concept clarity: Understanding the Molecular Weight Distribution in polymers.
- Problem solving: Calculating the material balance for a multi-component distillation column.
- Application-based learning: Analyzing the environmental impact of refinery effluents. All selected topics must align with the specific Course Outcomes (COs) of the curriculum.

Step 2: Formation of Peer Groups

- Students are divided into small heterogeneous groups of 4–6 members.
- Each group is balanced with high performers (who may act as technical leads), average learners, and slow learners to ensure mutual support.
- A Peer Leader is assigned to coordinate the discussion on topics like catalytic cracking.

Step 3: Orientation and Guidelines

- Faculty explain the benefits of peer learning, such as how explaining a process like "Heat Exchange" to a peer solidifies one's own understanding.
- Roles are defined, such as who will record the group's findings and who will present the final design.

Step 4: Learning Material Distribution The following are provided through Google Classroom or the departmental LMS:

- **Study materials:** Comprehensive guides on crude oil characterization.
- **Problem sets:** Calculations for reactor residence time.
- **Case studies:** Real-world analysis of petrochemical plant safety incidents.

Step 5: Peer Group Learning Activity

- Students discuss the assigned petrochemical topics within their groups.
- Peer leaders facilitate the explanation of difficult concepts like "Azeotropic Distillation".
- Members solve engineering problems collaboratively, sharing different approaches to process optimization.

Step 6: Faculty Facilitation

- The faculty member monitors the group discussions to ensure they remain focused on the technical objectives.
- They clarify difficult chemical kinetics or thermodynamic laws that the group cannot resolve alone.
- They ensure every student, particularly the "learner" role, is actively engaged.

Step 7: Assessment of Peer Learning Assessments are conducted through:

- **Short quizzes:** On the properties of various petrochemical feedstocks.
- **Assignments:** Individual reports on heat transfer mechanisms.

- **Group presentations:** Presenting a group-designed P&ID (Piping and Instrumentation Diagram). Evaluation focuses on both individual technical knowledge and the group's ability to collaborate.

Step 8: CO Attainment Analysis

- Assessment results are mapped to Petrochemical Course Outcomes.
- Faculty analyze the data to determine if the peer-led approach improved the students' ability to apply engineering principles to real-world refinery problems.