

Process Engineering Fundamentals Cheat Sheet

Course link: <https://boostrand.com/free-course>

1. Prprocess Design

- Definition: The design of processes for desired physical and/or chemical transformation of materials
- Importance: Ensures safe, efficient, and economical operation of process plants
- Project Workflow: Sequence of activities to complete a process design project

2. Process Design Stages

- Conceptual Design: Develop process concept, preliminary equipment sizing, and cost estimates
- FEED (Front-End Engineering Design): Detailed design, equipment specifications, and construction planning
- Detailed Design: Finalize detailed drawings, specifications, and construction plans
- Construction and Commissioning: Build and test the process plant
- Startup: Begin operation of the process plant

3. Process Simulation and PFD Preparation

- Process Simulation: Use software to model and optimize the process
- PFD (Process Flow Diagram): Schematic representation of the process, showing major equipment and material flows

4. P&ID Preparation

- P&ID (Piping and Instrumentation Diagram): Detailed diagram showing all equipment, piping, instrumentation, and control systems
- Standard Symbols: Represent equipment, valves, instruments, and line types

5. Equipment Sizing

- Pipes: Size based on flow rate, velocity, and pressure drop
- Pumps: Select based on required flow rate and pressure
- Heat Exchangers: Size based on heat duty and temperature requirements
- Tanks and Vessels: Size based on required volume and residence time

6. Process Safety

- Hazard Identification: Identify potential hazards in the process
- Risk Assessment: Evaluate the likelihood and consequence of potential incidents
- Safety Systems: Implement safety features such as pressure relief valves, emergency shutdowns, and fire protection