

CHEMICAL ENGINEERING EDUCATION: NEED FOR OVERHAULING THE CURRICULUM

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ABSTRACT

The chemical engineering discipline has been evolving over the years continuously without any limits both in breadth as well as in depth. The beauty of this discipline lies in its ability to be versatile and its adaptability to various inter-disciplinary areas (environmental engineering, bio-chemical engineering, energy engineering, optimization, to name a few).

Till Drake discovered crude oil in 1859, it was the chemists and mechanical engineers who used to do the job of a chemical engineer. But it is the discovery of crude oil, which led to the feeling among the scientists and academicians that there is a need to have a separate discipline in order to cater to the needs of processing and purifying various useful products from crude oil. Then chemical engineering is defined as the combination of Unit operations and Unit processes. The roots of chemical engineering discipline are physics, chemistry and mathematics.

Keeping the history and versatility of chemical engineering discipline as background, considering the AIChE definition and the working definition of the matured chemical engineering discipline, and bearing the challenges ahead of chemical engineer in mind, the complete process design (chemical engineering) can be viewed as being carried out in the following three stages:

1. Process Synthesis
2. Process Analysis
3. Optimization

Keeping the above new format into account, this paper presents the need to overhaul the chemical engineering discipline incorporating the thrust areas such as conceptual design involving various levels of hierarchy of decisions to be made including energy integration, bio-chemical engineering aspects, environmental engineering aspects, and evolutionary computation based optimization techniques, specific purpose and dynamic

simulation techniques, decomposition of networks, etc., which are essential for process plant simulation and hazard-free, safe and clean technological operations in any chemical industry. This study also focuses on the importance and significance of the humanistic studies component in chemical engineering curriculum.