



# UNIT OPERATIONS OF PARTICULATE MATTER

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**INTENDED AUDIENCE :** It is a core course for Undergraduate students. However, this course will also be helpful for anyone of any professional level,

preferably holding a college degree or with substantial industrial experience, working in the production, handling, processing,

modification and transportation of particulate matter.

**INDUSTRIES APPLICABLE TO :** Any chemical industry which deals with particulate matter

## COURSE OUTLINE :

Around 75% of chemical manufacturing processes involve small solid particles at some point. Proper design and handling of these fine particles often makes the difference between success and failure of the product. Many products such as catalysts, pigments, fertilizers, cements, ceramics and pharmaceuticals are currently manufactured in particulate forms. Unit Operations of Particulate Matter deal with Science and Technology of solid material, which is a multidisciplinary field including Materials Science, Environmental, Biomedical, Aerospace, Agricultural, Chemistry, Microbiology and Cell Science, Pharmacy and Medicine. The primary objective of this course is to

- Identify the important physical mechanisms occurring in processes involving particles
- Formulate and solve mathematical descriptions of such processes
- Apply this knowledge to the design of particulate systems such as Sedimentation tank, Filtration unit, Fluidization unit, Flotation cell, etc.

## ABOUT INSTRUCTOR :

Prof. Shabina Khanam is working as Associate Professor in Chemical Engineering Department of IIT Roorkee. She has completed B.Tech degree from AMU Aligarh, Aligarh in 2000 and M.Tech and Ph.D. degree from IIT Roorkee in 2002 and 2007, respectively. Her major field of study is Process Integration, Energy and Mass Conservation and Modeling and Simulation of Chemical Processes. She has almost 10 years experience in teaching and research. During this period she has supervised 2 Ph.D. and 19 M.Tech. theses. At present 6 Ph.D and 3 M.Tech theses are in pipe line. She has published 29 and 26 research papers in different refereed journals and conferences, respectively. She has taught the proposed course six times in her 10 years teaching career.

## COURSE PLAN :

### Week 1 : Introduction

Sedimentation and Design of Thickener

Centrifugal Sedimentation

Industrial Equipment

### Week 2 : Filtration

Batch Filtration

Continuous Filtration

Filtration Equipment

### Week 3 : Fluidization

Liquid Fluidization

Gas Fluidization

### Week 4 : Flotation

Transportation of Solids

Hydraulic Transport and Pneumatic Transport