



# CHEMICAL PROCESS UTILITIES

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IIT Roorkee

**TYPE OF COURSE** : New | Core | UG/PG  
**COURSE DURATION** : 12 Weeks (24 Jan' 22 - 15 Apr' 22)  
**EXAM DATE** : April 23, 2022

**PRE-REQUISITES** : Chemical Engineering Thermodynamics, Chemical Technology, Heat Transfer

**INTENDED AUDIENCE** : Chemical engineering, Polymer engineering, Polymer technology, Mechanical engineering

**INDUSTRIES APPLICABLE TO** : Useful for all process industries, refineries, fertilizer plants, petrochemical plants specially for managers and decision makers

**COURSE OUTLINE :**

Importance of process utilities in a typical chemical process plant is enormous. Without fundamental knowledge of process utilities it is very difficult to survive in a chemical plant. As chemical process technology becomes more complex, chemical engineers will need a more detailed and fundamental understanding of different utilities. The course focuses on understanding the important technical fundamentals of chemical process utilities. The emphasis on the fundamentals will help the student to understand the concepts and apply them accordingly. This application requires a significant quantity of fundamental knowledge and technology

**ABOUT INSTRUCTOR :**

Prof. Shishir Sinha is presently working as Professor in the Department of Chemical Engineering at IIT Roorkee. He has been teaching the courses related to Process Utilities and Safety, Chemical Engineering Thermodynamics and safe Operation to Petroleum industries to undergraduate and postgraduate students for more than 12 years. Prof. Sinha has more than 20 years of academic and industrial research experience with 76 publications besides more than 77 in conference proceedings. Apart from this he has written 9 books and several book chapters. Successfully completed over 22 high impact projects and consultancies

**COURSE PLAN :**

**Week 1:** Utilities in process industries, primary & secondary and their importance.

**Week 2:** Heat Transfer Media : Classification, characteristic properties, selection criteria for their industrial applications

**Week 3:** Water : Raw water and its characteristics treatment and conditions for use in process industries, e.g. for boiler feed, cooling etc., recycling and reuse of water

**Week 4:** Water treatment and water resource management

**Week 5:** Steam Generation & Utilization : Steam generation, modern boilers, steam handling, condensate removal.

**Week 6:** Steam traps-classification and characteristics, condensate utilization and flash steam, Efficient steam heating systems, Safety in boiler systems.

**Week 7:** Air : Use of air in process in industries for conveying, drying and instrumentation; design of air receivers.

**Week 8:** Piping Network : Design of pipelines and piping networks for water, steam, condensate and air

**Week 9:** Properties of air water vapors: Cooling towers

**Week 10:** Pressure and Vacuum systems

**Week 11:** Refrigeration systems

**Week 12:** Refractories and insulation