## BACHUS PUMP COURSE OUTLINE

1. **Basic Pump Principles**
   - How Pumps Work
   - Head vs. Pressure
   - Pressure Measurement
   - Absolute Pressure
   - Gauge Pressure
   - Vacuum

2. **NPSH**
   - NPSH required
   - NPSH available

3. **Cavitation**
   - Vapor Pressure
   - Types of Cavitation
   - Effects & Prevention

4. **Affinity Laws**
   - The Laws
   - Speed & Diameter
   - Practical Application

5. **Work & Efficiency**
   - Flow & Head
   - Efficiency
   - Horsepower

6. **Pump Classification**
   - PD types
   - Centrifugal types
   - Impellers
   - ANSI / API
   - Specific Speed
   - Suction Specific Speed

7. **Pump Curves**
   - H-Q
   - Eff. & BHp
   - NPSHr
   - Family Curves

8. **System Curves**
   - TDH
   - Elevation, Pressure & Losses
   - Pumps in Series & Parallel

9. **Shaft Deflection**
   - Interpreting the Evidence
   - Maintenance Operation & Design

10. **Pump- Motor Alignment**
    - Types of Misalignment
    - Alignment Techniques

11. **Bears**
    - Types & Services
    - Lubrication
    - Maintenance & Seals

12. **Pump Packing**
    - Components
    - Packing Procedures
    - Failure & Leakage

13. **Mechanical Seals**
    - Components
    - Single & Double
    - Support Systems

14. **Seal Failure Analysis**
    - Causes & Prevention
    - Environmental Controls

15. **Practical Maintenance**
16. **Avoiding Wear**

17. **Pump Piping**
    - Draining Tanks
    - Suction pipe arrangement
    - Discharge pipe arrangement