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| 1. | Title of the course | Fluid and Particle Mechanics |
| 2. | Course number | CH2103 |
| 3. | Status of the course | Core |
| 4. | Structure of credits | 3-1-0-4 |
| 5. | Offered to | UG |
| 6. | New course/modification to | New course |
| 7. | To be offered by | Department of Chemical Engineering |
| 8. | To take effect from | July 2020 |
| 9. | Prerequisite | Nil |
| 10. | Whether approved by the Department | Yes |
| 11. | **Course Objective(s):** To provide fundamentals of fluid flow and hydrodynamics in particle-fluid systems through macroscopic and microscopic approach. | |
| 12. | **Course Content:** Introduction to fluid mechanics; Fluid statics; Integral balances and Bernoulli equation; Inviscid and potential flows; Concept of momentum transfer through Newton's law of viscosity: laminar flow; Differential balances: Navier-Stokes equation with applications; Dimensional analysis; Introduction to turbulence; Boundary layer theory; Pipe flows and use of friction factor charts; Agitation and mixing; Flow measurement; Fluid transportation by pumps; Introduction to non-Newtonian fluids; Flow past solid bodies; Settling of particles in fluid; Sedimentation; Flow through packed bed; Filtration; Fluidization; Fluid-solid conveying. | |
| 13. | **Textbook(s):**<br>1. McCabe W L, Smith J C and Harriot P, *Unit Operations of Chemical Engineering*, 7th Edition, Tata McGraw Hill (2014).<br>2. Nevers N d, *Fluid Mechanics for Chemical Engineers*, 3rd Edition, Tata McGraw Hill (2011). | |
| 14. | **Reference(s):**<br>1. Bird R B, Stewart W E and Lightfoot E N, *Transport Phenomena*, 2nd Edition, Wiley India (2006).<br>2. Chhabra R P and Basavraj M G, *Coulson and Richardson's Chemical Engineering: Particulate Systems and Particle Technology, Volume 2a*, 6th Edition, Butterworth-Heinemann (2019).<br>3. Darby R and Chhabra R P, *Chemical Engineering Fluid Mechanics*, 3rd Edition, CRC Press India (2016).<br>4. Welty J, Wicks C E, Wilson R E and Rorrer G L, *Fundamentals of Momentum, Heat and Mass Transfer*, 5th Edition, Wiley India (2010). | |