

NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Interfacial Engineering

Subject Co-ordinator - Prof. Manigandan

Co-ordinating Institute - IIT - Ropar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Introduction to interfaces
- Lecture 2 - Importance of surface; Application of interfaces
- Lecture 3 - Basics of classical and emerging tools
- Lecture 4 - Concepts of capillarity and surface tension (ST) and measurement of ST and contact angle
- Lecture 5 - Overview of various surface tension measurement techniques
- Lecture 6 - Young-Dupre equation; Tutorial
- Lecture 7 - Young-Laplace equation; Tutorial
- Lecture 8 - Kelvin equation; Tutorial
- Lecture 9 - Contact angle for ideal and non-ideal cases; Application of Young-Dupre
- Lecture 10 - Measurement of contact angle of surfaces at fluid-fluid interfaces
- Lecture 11 - Washburn approach; Tutorial
- Lecture 12 - Work of cohesion, adhesion, and spreading coefficient
- Lecture 13 - Girifalco-Good Fowkes equation; Tutorial
- Lecture 14 - Demonstration of force tensiometer
- Lecture 15 - Demonstration of optical tensiometer
- Lecture 16 - Shapes of micelles, critical micelle concentration (CMC); critical packing parameter (CPP)
- Lecture 17 - Thermodynamic principles of self-assembly
- Lecture 18 - Micellar-enhanced ultrafiltration (MEUF): A surfactant-based separation technique
- Lecture 19 - HLB guidelines; Debye plot
- Lecture 20 - Surface excess concepts and problem solving
- Lecture 21 - Gibbs adsorption isotherm equation
- Lecture 22 - Deposition of Langmuir Blodgett (LB) films; Adsorption from solution
- Lecture 23 - Demonstration of double barrier LB deposition technique
- Lecture 24 - Emulsion and microemulsion; Application of microemulsion
- Lecture 25 - Demonstration of emulsification using several emulsifying devices
- Lecture 26 - Demonstration of particle size analyzer
- Lecture 27 - Demonstration of particle/droplet tracking using an inverted microscope
- Lecture 28 - Introduction to colloids
- Lecture 29 - Understanding Intermolecular forces

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- Lecture 30 - van der Waals force
- Lecture 31 - Lifshitz approach
- Lecture 32 - Electrical double layer (EDL) interaction (Helmholtz)
- Lecture 33 - Gouy-Chapman EDL Model
- Lecture 34 - Gouy-Chapman-Stern EDL model
- Lecture 35 - Overlapping double layer interaction
- Lecture 36 - Derjaguin approximation; DLVO forces of interactions
- Lecture 37 - Force-measuring techniques: Direct and indirect measurements
- Lecture 38 - Steric (Polymer-mediated) forces
- Lecture 39 - Electrokinetic phenomena
- Lecture 40 - Demonstration of zeta potential measurements