

Nano - Soft Course Schedule (revised)

Classroom

Sl. No.	Date	Instructor	Topics	Time
NS1	10.02.2018	Prof. G. U. Kulkarni	Concepts and Definitions: nanoscale processes, nanosystems, important nanomaterials, historical account	11.00 AM – 12 Noon
NS2	10.02.2018	Prof. G. U. Kulkarni	Quantum confinement and Surface effects in nanosystems, Size-dependent properties- optical, electronic, magnetic and reactivity – I	12.15 PM – 01.15 PM
NS3	21.02.2018	Dr. S. Krishna Prasad	Overview of Soft Matter Phenomenon of double melting: Plastic crystals and liquid crystals, Classification of liquid crystals: nematic, cholesteric and smectic phases	5.30 PM – 6.30 PM
NS4	23.02.2018	Dr. S. Krishna Prasad	Order parameters for different liquid crystalline phases and their experimental determination, Critical phenomena	5.30 PM – 6.30 PM
NS5	24.02.2018	Dr. Neena S. John	Synthesis: top-down and bottom-up, hybrid methods	11.00 AM – 12 Noon
NS6	26.02.2018	Dr. D. S. Shankar Rao	Diffraction of X-rays by liquids and liquid crystals, Information obtained from X-ray studies on liquid crystalline materials. Comparison between 2-D and 3-D crystallography	9.30 AM – 10.30 AM
NS7	28.02.2018	Dr. S. Angappane	Nanolithography- concepts and methods: optical-, electron-, ion- beam lithography, micromolding, nanoimprint lithography, clean room practices	5.30 PM – 6.30 PM
NS8	03.03.2018	Prof. Krishnamurthy K. S.	Liquid crystals: Optical, electrical and magnetic properties	11.00 AM – 12.30 PM
NS9	07.03.2018	Dr. S. Angappane	Thin films: metal, semiconductor and organic films	5.30 PM – 6.30 PM
NS10	09.03.2018	Dr. S. Krishna Prasad	Applications of liquid crystals	5.30 PM – 6.30 PM
NS11	14.03.2018	Dr. S. Angappane	Deposition techniques and thickness monitoring, growth modes, heterostructures	5.30 PM – 6.30 PM
NS12	17.03.2018	Dr. Geetha G. Nair	Rheology of gels and liquid crystals	11.00 AM – 12.30 PM
NS13	26.03.2018	Dr. P. Viswanath	Films on liquid substrates – Langmuir films, phases of monomolecular films, phase transition, mixed monolayers, surface manometry, Brewster angle microscopy and epifluorescence microscopy	9.30 AM – 10.30 AM
NS14	28.03.2018	Dr. P. Viswanath	Films on solid substrates – Ellipsometry, spin coating, self assembled monolayers, Langmuir-Blodgett films. Contact angle measurements. Wetting and dewetting behavior. Adsorption isotherms	05.30 PM – 06.30 PM

NS15	07.04.2018	Dr. Veena Prasad	Chemistry of conventional and unconventional low molar mass liquid crystals	11.00 AM – 12.00 Noon
NS16	09.04.2018	Dr. Pralay K. Santra	Electronic structure of semiconductor, work function, Fermi energy, conduction and valence band, direct and indirect band gap materials, p and n type material, p – n junction	9.30 AM – 10.30 AM
NS17	11.04.2018	Dr. Pralay K. Santra	Photovoltaics – working principle. Different types of solar cells and their working mechanism	5.30 PM – 6.30 PM
NS18	13.04.2018	Dr. C. V. Yelamagad	Basic molecular structural needs for materials exhibiting mesomorphism, Driving forces for liquid crystal phase formation, Influence of Optical Activity, Monomers, Oligomers and Polymers	5.30 PM – 6.30 PM
NS19	14.04.2018	Dr. H.S.S.R. Matte	Carbon nanomaterials: fullerenes, nanotubes and graphene; analogues and hybrids - I	11.00 AM – 12.30 PM
NS20	18.04.2018	Prof. K. A. Suresh	Surface and interfaces, surface tension, spreading of a liquid on another liquid, criteria for spreading. Liquid-liquid demixing, phase separation, spinodal decomposition	5.30 PM – 6.30 PM
NS21	25.04.2018	Prof. K. A. Suresh	Microscopy of solid surfaces, optical microscopy, scanning probe microscopy. Surfactants, microemulsions, foam structure and foam stability	5.30 PM – 6.30 PM
NS22	02.05.2018	Prof. G. U. Kulkarni	Quantum confinement and Surface effects in nanosystems, Size-dependent properties-optical, electronic, magnetic and reactivity – II	5.30 PM – 6.30 PM
NS23	11.05.2018	Dr. H. S. S. R. Matte	Carbon nanomaterials: fullerenes, nanotubes and graphene; analogues and hybrids – II	5.30 PM – 6.30 PM

Lab Work (2.00 PM -5.30 PM)

Sl. No.	Date	Instructor	Topics
NSE1	19.02.2018	Prof. G. U. Kulkarni	Elucidation of the Nanoscale
NSE2	26.02.2018	Dr. S. Krishna Prasad	Permittivity measurements, influence of anisotropy, Dielectric spectroscopy
NSE3	05.03.2018	Prof. Krishnamurthy K. S.	Nematics: Temperature variation of birefringence, the Freedericksz transition and determination of elastic constants
NSE4	12.03.2018	Dr. Pralay K. Santra	Synthesis of quantum dots, UV-VIS absorption spectroscopy, determination of band gap and size of quantum dot from absorption spectra
NSE5	19.03.2018	Dr. D. S. Shankar Rao	Xray Diffraction from layered and columnar structures, importance of 2D crystallography
NSE6	26.03.2018	Dr. Geetha G. Nair	Shear flow behaviour of Newtonian and Non-Newtonian fluids
NSE7	02.04.2018	Dr. S. Angappane	XRD for nanoparticles and films
NSE8	09.04.2018	Dr. Neena S. John	Atomic Force Microscopy
NSE9	16.04.2018	Dr. Veena Prasad	(a) Cleaning and drying the laboratory glassware (b) Purification of LC compounds by recrystallisation technique
NSE10	23.04.2018	Prof. K. A. Suresh	Determination of the ellipsometric angles delta and psi; (relative phase difference and amplitude change) for a birefringent film and estimating its thickness using one-zone method.
NSE11	07.05.2018	Dr. C. V. Yelamaggad	Synthesis of 4-n-alkoxybenzoic acids and Schiff bases
NSE12	14.05.2018	Dr. P. Viswanath	Dilatational moduli of a fatty acid monolayer at the air-water interface
NSE13	21.05.2018	Dr. S. Angappane	Scanning Electron Microscopy
NSE14	28.05.2018	Dr. H. S. S. R. Matte	Raman: CNT and graphene

