

## Nano - Soft Course Schedule: Class Room

Sl. No.	Date Day	Instructor	Topics	Time
NS1	<b>25.01.2019</b> <b>Fri</b>	Prof. G. U. Kulkarni	Concepts and Definitions: nanoscale processes, nanosystems, important nanomaterials, historical account	11.00 AM – 12 Noon
NS2	<b>30.01.2019</b> <b>Wed</b>	Prof. G. U. Kulkarni	Quantum confinement and Surface effects in nanosystems, Size-dependent properties-optical, electronic, magnetic and reactivity – I	02.30 PM – 03.30 PM
NS3	<b>01.02.2019</b> <b>Fri</b>	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	11.00 AM – 12 Noon
NS4	<b>06.02.2019</b> <b>Wed</b>	Dr. S. Krishna Prasad	Order parameters for different liquid crystalline phases and their experimental determination, Critical phenomena	02.30 PM – 03.30 PM
NS5	<b>08.02.2019</b> <b>Fri</b>	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	11.00 AM – 12 Noon
NS6	<b>13.02.2019</b> <b>Wed</b>	Dr. Geetha G. Nair	Rheology of gels and liquid crystals	2.30 PM – 3.30 PM
NS7	<b>15.02.2019</b> <b>Fri</b>	Prof. K.S. Krishnamurthy	Liquid crystals: Optical, electrical and magnetic properties	11.00 AM – 12.30 PM
NS8	<b>22.02.2019</b> <b>Fri</b>	Dr. S. Angappane	Nanolithography- concepts and methods: optical-, electron-, ion- beam lithography, micromolding, nanoimprint lithography, clean room practices	2.30 PM – 3.30 PM
NS9	<b>01.03.2019</b> <b>Fri</b>	Dr. S. Angappane	Thin films: metal, semiconductor and organic films	11.00 AM – 12 Noon
NS10	<b>06.03.2019</b> <b>Wed</b>	Dr. S. Krishna Prasad	Applications of liquid crystals	2.30 PM – 3.30 PM
NS11	<b>13.03.2019</b> <b>Wed</b>	Dr. S. Angappane	Deposition techniques and thickness monitoring, growth modes, heterostructures	2.30 PM – 3.30 PM
NS12	<b>15.03.2019</b> <b>Fri</b>	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	11.00 AM – 12 Noon

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NS13	22.03.2019 Fri	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	11.00 AM – 12 Noon
NS14	27.03.2019 Wed	Dr. H.S.S.R. Matte	Carbon nanomaterials: fullerenes, nanotubes and graphene; analogues and hybrids - I	2.30 PM – 4.00 PM
NS15	29.03.2019 Fri	Dr. Veena Prasad	Chemistry of conventional and unconventional low molar mass liquid crystals	11.00 AM – 12 Noon
NS16	29.03.2019 Fri	Dr. Neena S. John	Synthesis: top-down and bottom-up, hybrid methods	2.30 PM-3.30 PM
NS17	03.04.2019 Wed	Dr. C. V. Yelamaggad	Basic molecular structural needs for materials exhibiting mesomorphism, Driving forces for liquid crystal phase formation, Influence of Optical Activity, Monomers, Oligomers and Polymers	2.30 PM – 3.30 PM
NS18	05.04.2019 Fri	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	11.00 AM – 12 Noon
NS19	10.04.2019 Wed	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	2.30 PM – 3.30 PM
NS20	12.04.2019 Fri	Prof. K. A. Suresh	Microscopy of solid surfaces, optical microscopy, scanning probe microscopy. Surfactants, microemulsions, foam structure and foam stability	11.00 AM – 12 Noon
NS21	24.04.2019 Wed	Dr. Pralay K. Santra	Photovoltaics – working principle. Different types of solar cells and their working mechanism	2.30 PM – 3.30 PM
NS22	26.04.2019 Fri	Prof. G. U. Kulkarni	Quantum confinement and Surface effects in nanosystems, Size-dependent properties-optical, electronic, magnetic and reactivity – II	11.00 AM – 12 Noon
NS23	01.05.2019 Wed	Dr. H. S. S. R. Matte	Carbon nanomaterials: fullerenes, nanotubes and graphene; analogues and hybrids – II	2.30 PM – 3.30 PM

### Lab Work (2.00 PM -5.30 PM) on Mondays

Sl. No.	Date	Instructor	Topics
NSE1	04.02.2019	Prof. G. U. Kulkarni	Elucidation of the Nanoscale
NSE2	11.02.2019	Dr. S. Krishna Prasad	Permittivity measurements, influence of anisotropy, Dielectric spectroscopy
NSE3	18.02.2019	Dr. Pralay K. Santra	Synthesis of quantum dots, UV-VIS absorption spectroscopy, determination of band gap and size of quantum dot from absorption spectra
NSE4	25.02.2019	Dr. D. S. Shankar Rao	Xray Diffraction from layered and columnar structures, importance of 2D crystallography
NSE5	04.03.2019	Dr. Neena S. John	Atomic Force Microscopy
NSE6	11.03.2019	Prof. K.S. Krishnamurthy	Nematics: Temperature variation of birefringence, the Freedericksz transition and determination of elastic constants
NSE7	18.03.2019	Dr. Geetha G. Nair	Shear flow behaviour of Newtonian and Non-Newtonian fluids
NSE8	25.03.2019	Dr. S. Angappane	XRD for nanoparticles and films
NSE9	08.04.2019	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.
NSE10	15.04.2019	Dr. H. S. S. R. Matte	Raman: CNT and graphene
NSE11	22.04.2019	Dr. C. V. Yelamaggad	Synthesis of 4-n-alkoxybenzoic acids and Schiff bases
NSE12	29.04.2019	Dr. P. Viswanath	Dilatational moduli of a fatty acid monolayer at the air-water interface
NSE13	06.05.2019	Dr. S. Angappane	Scanning Electron Microscopy
NSE14	13.05.2019	Dr. Veena Prasad	(a) Cleaning and drying the laboratory glassware (b) Purification of LC compounds by recrystallisation technique