Semester	AUG 2022
Open to semester	7,13
Course code	**CH4153**
Course title	**Advanced Physical Chemistry Laboratory**
Credits	3 /
Course Coordinator & participating faculty (if any)	Pramod Pillai,* Pankaj Mandal, Muhammed Musthafa
Nature of Course	Lab
Pre-requisites	None
Objectives (goals, type of students for whom useful, outcome etc)	This course comprises of laboratory experiments based on the fundamental concepts in chemistry. Experiments offered in this course provide students an opportunity to learn advanced instrumentation techniques as well as its application to study a variety of physical chemistry problems. One of the main goals of this course is to train students in understanding how physical techniques can be utilized to probe molecular systems and advanced materials.
Course contents (details of topics /sections with no. of lectures for each)	Experimental procedures/details will be given in the first class. You will be doing ~10 experiments in advanced physical chemistry topics. Each class will start with explanation (theory) for 15-30 minutes, followed by 2.5 h lab work. Tentative list of experiments 1) Experimental Demonstration of the Particle in a Box Model using Optical Properties of CdS Quantum Dots 2) Determination of Fluorescence Quantum Yield of Molecular Dye and Quantum Dot using a Known Reference Dye 3) Ferrocyanide/Ferricyanide Freely Diffusing Redox Couple: A Cyclic Voltametric Investigation. 4) Potential Triggered Emission of Light: Demonstration of Electrochemiluminescence. 5) Introduction of Structural Anisotropy in Nanoparticle Formation. 6) Bench-top Pattering using Soft Lithography. 7) Dye-Sensitized Solar Cell (DSSC): An Example with Blackberry as the Dye.

	8) Estimation of pKa* in the First Excited Singlet State. 9) Determination and Comparison of Carbonyl Stretching Frequency of a ketone in its Ground State and first electronic Excited State.
Evaluation /assessment	End-Sem Examination-% Mid-Sem Examination-% Others-Based on experimental skills, lab report, record keeping and viva. Lab notebook: 50 % Daily interaction = 10% Oral viva = 15% Written quiz = 25%%
Suggested readings (with full list of authors, publisher, year, edn etc.)	1. Modern Molecular Spectroscopy, J. M. Hollas, Fourth Edition, Wiley 2010. 2. THE BELL SYSTEM TECHNICAL JOURNAL, By F. M. SMITS, MAY 1958, Page 711. 3. Modern Electrochemistry, Bockris and Reddy, 2nd edition (Volume 1 to 3), Springer 1998 4. Electrochemical Methods: Fundamentals and Applications, A. J Bard and L. R Fualkner, 2nd edition, Wiley 2001 5. The Chemistry of Nanomaterials: Synthesis, Properties and Applications, C. N. R. Rao, Achim Müller, Anthony K. Cheetham, Vol. 1, Wiley 2006 6. Nanoscale Materials, Liz-Marzán,L. M.; Kamat, P. V. Vol. 1, Springer 2003