Semester	AUG 2022
Open to semester	5,7,11,13,21
Course code	**BI3174/BI6184**
Course title	**Advanced Biochemistry - I**
Credits	4 /4
Course Coordinator & participating faculty (if any)	Siddhesh Kamat*, Sudha Rajamani
Nature of Course	Lectures
Pre-requisites	No prerequisites
Objectives (goals, type of students for whom useful, outcome etc)	The course aims at introducing advanced concepts in biochemistry and provides a framework to understand basic biomolecular function. Its special emphasis is on studying enzymes as biological catalysts and understanding the chemistry of enzymatic transformations. It also deals with routine and advanced methodologies used in generating and analyzing biochemical data. This course is essentially meant to help understand biology from the point of view of molecules and physicochemical principles.
Course contents (details of topics /sections with no. of lectures for each)	Section # 1: Biomolecular purification and characterization: We will cover a range of biochemical techniques pertaining to, both, routine lab techniques (chromatography, gels etc), and to the more specialized ones (including fluorescence based techniques, HPLC, Mass spectrometry). (Lectures: 12) Section # 2: We will discuss the basics of biomolecular interactions with a focus on proteins and nucleic acids (and lipids, time permitting). This will be done mainly from a viewpoint of understanding how biomolecular characterization techniques allow for delineating such interactions. We will try and do paper presentations if feasible (6 classes) Section # 3: Enzyme biochemistry: enzyme catalyzed reactions, steady state enzyme kinetics, enzyme inhibition, multisite and allosteric enzymes, pH rate profiles, viscosity effects, isotopic effects in enzyme catalysis, cleland notations, pre-steady state enzyme kinetics (Lectures: ~ 10) Section # 4: Enzyme catalyzed reactions: hydrolysis of

	peptides bonds, phosphate transfer and hydrolysis, the amidohydrolase family, the enolase family, the amidotransferases & molecular tunnels, NAD catalyzed reactions, and the radical SAM superfamily (Lectures: ~ 10) Section 1 & 2 will be taught by Sudha Rajamani, and sections 3 & 4 will be taught by Siddhesh Kamat
Evaluation /assessment	End-Sem Examination-35% Mid-Sem Examination-35% Others-Others-15% for Paper discussions/poster making (by Sudha Rajamani) 15% for review writing & assignments (by Siddhesh Kamat)%%
Suggested readings (with full list of authors, publisher, year, edn etc.)	Text Book(s): Biochemistry Voet, D., Voet, J.G. Publisher: Wiley; 3 edition Lehninger Principles of Biochemistry David L. Nelson, Michael M. Cox. Publisher: W. H. Freeman, Fourth Edition Jeremy M Berg; John Tymoczko; Lubert Stryer (2012), Biochemistry, 7th/6th edition (or older), Wiley. Enzyme kinetics and mechanism, Paul Cook & W. W. Cleland Enzyme reaction mechanisms, Perry Frey & Adrian D. Hegeman. Also, primary research articles and reviews would be utilized to provide contemporary insights into the field.