



BIOINTERFACE ENGINEERING

PROF. LALIT M. PANDEY

Department of Biotechnology and Bioengineering
IIT Guwahati

PRE-REQUISITES : Bachelor Degree in any Engineering discipline

INTENDED AUDIENCE : Under graduate and post graduate students, professional, practitioner in the discipline of Biosciences and Bioengineering, Chemical Engineering and Material Science and Engineering.

INDUSTRIES APPLICABLE TO : Industries dealing with Biomedical implants and devices and Biomaterials

COURSE OUTLINE :

The aim of the course is to create a surface chemical way of thinking when considering biomedical approaches, products and applications. The course will focus on surface and surface chemistry and its interactions with biomacromolecules. This course will highlight the role of interfacial phenomena towards behavior of biomolecules on surfaces. The first half of this course will cover basic physical chemistry of surfaces and interfaces, and common experimental methods for surface characterization. The second part of the course will emphasize interactions of biological systems with surfaces and modified surfaces at the molecular and cellular levels.

ABOUT INSTRUCTOR :

Prof. Lalit M. Pandey is an Associate Professor in the Department of Biosciences and Bioengineering, IIT Guwahati. He has completed his Ph.D. in Chemical Engineering from IIT, Delhi. He was awarded Erasmus Mundus India4EU fellowship to pursue his research at Grenoble-INP, France for 18 months during 2010 to 2012. Prior to joining IIT Guwahati, he was working as a Scientist with the Central Pollution Control Board, Govt of India from 2009 to 2014. He has received DST-UKIERI award 2018, IEI Young Engineers Award 2017, INSPIRE Faculty Award 2014 and Early Career Research Award from SERB, Govt. of India. He has worked in the area of Chemical & Biochemical engineering including Surface and Interfacial Science (focusing on the Bio-interfaces and Biomaterials, Protein, Ås structure and its stability), Nano and Biotechnology, and Environment Chemical Engineering. He has taught six different courses at both UG and PG levels and developed two new courses; Biointerface Engineering, and Research Methodology. He has published 54+ research papers and 15+ book chapters. He has co-edited one book titled ÅBiointerface Engineering: Prospects in Medical Diagnostics and Drug Delivery, Å published by Springer Nature in 202

COURSE PLAN :

Week 1: Intermolecular Forces

Week 2: Adhesion and Wetting Phenomena

Week 3: Characterization of interfaces

Week 4: Protein-surface interactions

Week 5: Protein Aggregation

Week 6: Cell-surface interactions

Week 7: Surface modification and characterization

Week 8: Surface modification and characterization