INTENDED AUDIENCE : Anyone in bachelors having completed two year
PREREQUISITES : None. A course in biochemistry, molecular biology, anatomy is recommended
INDUSTRY SUPPORT : All pharmaceuticals, hospitals and biotechnology industries

COURSE OUTLINE :
This course introduces concepts of drug delivery to meet medical challenges. The course is designed to be modular, with each module focusing on the various aspects of drug delivery

ABOUT INSTRUCTOR :
Prof. Rachit Agarwal
Employment : Assistant Professor June 2017 present Centre for Biosystems Science and Engineering, Indian Institute of Science, Bangalore . Post-doctoral Fellow August 2013 May 2017 Andres J. Garcia, Georgia Institute of Technology, Atlanta, Georgia, USA Education . Ph.D. Biomedical Engineering May 2013 University of Texas at Austin, Texas, USA; Dissertation title: Effect of shape on cell internalization of polymeric hydrogel nanoparticles. Doctoral portfolio program in Nanoscience and Nanotechnology May 2013 University of Texas at Austin, Texas, USA . B.Tech and M.Tech (combined degree) - Biotechnology and Biochemical Engineering June 2009 Indian Institute of Technology, Kharagpur, India; Thesis Title: Crystallization and Enzyme Assay of GAPDH from TASAR Silk Worm

COURSE PLAN :

Week 1 :Pharmacokinetics: Bioavailability, Elimination, Therapeutic index
Week 2 :Prodrugs, Controlled release
Week 3 :Polymers: Synthesis, properties, characterization, crystallinity and amorposness
Week 4 :Biopolymers: Natural and Synthetic, biocompatibility, Biodegradation, commonly used biopolymers
Week 5 :Polymer-Drug conjugates, PEGylation
Week 6 :Diffusion controlled systems, Ficks laws, Reservoir systems, Non-erodible matrix systems, Bio-erodible Systems
Week 7 :Hydrogels: Physical or chemical, pore-size calculation, in-situ crosslinking
Week 8 :Nano and Micro-particles: Dendrimers, Liposomes, Micelles
Week 9 :Metal and polymeric particles, effect of particle shape, charge and elasticity
Week 10:Protein Adsorption and tissue engineering, Drug delivery in tissue engineering
Week 11:Implant associated infections, Route specific delivery: Oral, Subcutaneous, Intramuscular, transdermal, inhalation, intravenous
Week 12:Vaccines, Cancer vaccines, Cell and gene delivery, Smart responsive drug delivery, Targeted drug delivery, Nanotoxicology and market translation