Indian Institute of Science
Department of Bioengineering

BE 224 (Jan)
3:0
Diagnostics and Devices

Instructors: Dr. Bhushan Toley bhushan@iisc.ac.in
Dr. Sanhita Sinharay sanhitas@iisc.ac.in

Course Description: This course offers an understanding of the field of biomedical diagnostics and covers advances in technology pertaining to the field. The course will be conducted in two parts:

1. Part I of the course will cover an understanding of technologies used in most *in vitro* diagnostic tests conducted in pathology laboratories (hematology analyzers, blood glucometers, immunoassays, lateral flow assays, nucleic acid amplification tests) as well as dive deeper into upcoming technologies (microarrays, whole genome sequencing) that may transform *in vitro* medical diagnostics in the future. Applications of such technologies in infectious disease diagnostics, antimicrobial resistance detection, and cancer diagnostics will be discussed. This part will also cover ethical clearances, pre-clinical submissions, and regulatory requirements that are significant for translating such technologies.

2. Part II of the course will focus on *in vivo* diagnostic technologies used in the clinic- principles of computed tomography (CT), ultrasound, Magnetic Resonance Imaging (MRI), and Positron Emission Tomography (PET). This part will also cover some of the basic chemistry involved in developing contrast agents for CT and MRI and radiochemistry probes for PET. Finally, applications of these diagnostic methods in the field of cancer, infectious diseases, CNS, and autoimmune diseases will be discussed.