



**PD233 Aug 2:1**

## **Design of BioMedical Devices and Systems**

### **Instructor**

Dr. Manish Arora

Email: marora@iisc.ac.in

### **Teaching Assistant**

Siddharth Shivakumar Nair

Email: <siddharthnair@iisc.ac.in>

### **Department: CPDM**

Course Time:

Lecture venue: CPDM Classroom

Detailed Course Page: <http://cpdm.iisc.ac.in/utsaah/pd233/>

## **Announcements**

### **Brief description of the course**

The course covers basic topics in design of Biomedical Devices and Systems. The course will include guest lectures by healthcare professionals giving exposure to unmet needs in the healthcare technologies and systems. Students will get to apply learnings from the course on a real-life project under guidance from clinical collaborators.

### **Prerequisites**

none

### **Syllabus**

Medical Device Classification, Bioethics and Privacy, Biocompatibility and Sterilization Techniques, Design of Clinical Trials, Design Control & Regulatory Requirements. Introduction to specific medical technologies: Biopotentials measurement (EMG, EOG, ECG, EEG), Medical Diagnostics (In-vitro diagnostics), Medical Diagnostics (Imaging), Minimally Invasive Devices, Surgical Tools and Implants.

### **Course outcomes**

Awareness about medical device classification, regulatory requirements, and principals of bioethics.

A risk-based approach to medical device design and design control.

Working principals of various of medical technologies.

Role of design innovations in the advancement of medical technology.

Working in teams and with clinical collaborators.

## **Grading policy**

10% Assignment

10% Mid-term exam

10% End-term exam

70% Project work (with 5 deliverables over the term)

## **Assignments**

## **Resources**

Paul H. King, Richard C. Fries, Arthur T. Johnson, Design of Biomedical Devices and Systems, Third Edition, ISBN 9781466569133

John G. Webster (ed), Medical Instrumentation: Application and Design, 2007

Peter J. Ogradnik, Medical Device Design: Innovation from Concept to Market, Academic Press Inc; 1 edition (2012), ISBN-10: 0123919428

Stefanos Zenios , Josh Makower , Paul Yock , Todd J. Brinton , Uday N. Kumar , Lyn Denend , Thomas M. Krummel, Biodesign: The Process of Innovating Medical Technologies, Cambridge University Press; 1 edition (2009), ISBN-10: 0521517427

Online Resources:

Mayo Clinic Health Information Pages

Pubmed “ Biomedical Research Papers

Stanford Biodesign

Draft Indian Medical Device Rules 2016

GOI Medical Device Rules Notification (Jan2017 -English)

Newly Classified Medical Devices by CDSCO/GoI (June 2017)

Medical Device Classification as per EU MDD