



INTRODUCTION TO BIOMEDICAL IMAGING SYSTEMS

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PRE-REQUISITES : Engineering students from most core branch will be ready to take it in 6th-8th semester as they would have completed signals and systems and linear algebra.

INTENDED AUDIENCE : 7th-8th semester students from UG from Biomedical Engineering (BME) and other engineering programs (e.g., EE, ME, CSE, BT, etc.)

INDUSTRY SUPPORT : Most Medical imaging industry, MNC and otherwise, will recognize the value of this course

COURSE OUTLINE:

This course attempts to provide an introduction to the different commonly-used medical imaging systems. Although there are several courses and textbooks available from medical physics background, there are only few materials that treat the subject from a system's perspective, which is the view point taken here. This course will be thought at a level where the students from different engineering branches may find it useful. After the initial introduction and review modules, the different modalities can be taken as a stand-alone-module, and for each the physics, instrumentation, reconstruction and Image quality will be discussed.

ABOUT INSTRUCTOR :

Prof. Arun Kumar Thittai did his BE (Electronics and Communication Engineering) in India and proceeded to do MS and PhD (Electrical Engineering) in University of Houston, Texas, USA. He has been working in the area of biomedical imaging since 2004. Although his major research interest and work has been on ultrasound modality, he was involved and worked with collaborators to acquire MRI, PET, CT and Optical imaging of small animals for pre-clinical research during his post-doctoral fellowship stint at M.D. Anderson Cancer Center, Houston, Texas, USA. He has been offering this course routinely at IIT M since 2015 to students from different engineering departments.

COURSE PLAN :

Week 1: Introduction, 2D- Signals Systems review, Image Quality metrics

Week 2: Introduction, 2D- Signals Systems review, Image Quality metrics

Week 3: Projection Radiography

Week 4: Projection Radiography

Week 5: X-ray CT

Week 6: Nuclear Medicine- PET/SPECT

Week 7: Nuclear Medicine- PET/SPECT

Week 8: Ultrasound Imaging

Week 9: Ultrasound Imaging

Week 10: MRI

Week 11: MRI

Week 12: MRI