

BiS 452 - Biomedical Imaging

Summer 2016

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1. Class hours : 9:30AM–12:00PM on Mon., Tue., Wed., Thu., and Fri.
2. Classroom : #205 in Chung-Moon-Soul Building (Education 3.0 classroom)
3. Credit : 3 (3:0:3)
4. Goal : The goal of this course is to understand biomedical imaging systems such as X-ray, CT, SPECT, PET, Ultrasound, and MRI. The class includes physics for biomedical imaging systems and basic theories for signals and systems, image reconstruction algorithms like fast Fourier transform and filtered back projection, etc.
5. The class will be taught in an Education 3.0 format.
 - a. There will be no conventional lecture in the classroom (except the first class). Students should take video lectures in advance and take part in the in-class discussion.
 - b. There will be student group discussion on Monday, Wednesday, and Friday.
 - c. The classes on Tuesday and Thursday will be replaced with video lectures which the students should study in advance individually (no need to come to the classroom).
 - d. There will be a quick quiz for every homework at the end of the student group discussion.
 - e. Students can discuss the lecture contents and the homework questions, in preparation for quiz.
 - f. Students don't need to submit their homework.
 - g. Students can discuss various issues through KLMS website too. The instructor and TAs will answer for the questions.
 - h. Please get familiar with KLMS (KAIST Learning Management System) <http://edu3.kaist.ac.kr>
6. Grading : Quiz (Homework) 30%, mid-term exam 30%, final exam 30%, and attendance and attitude 10%.
7. Office hours : After the class hours or determined by appointment
8. TAs : TBA

9. Textbook : [Introduction to Medical Imaging: Physics, Engineering and Clinical Applications. Nadine Barrie Smith and Andrew Webb, ISBN-13: 978-0521190657.](#)

10. Contents and Schedule :

- (i) Introduction to biomedical imaging systems (week 1)
- (ii) Signals and systems (week 1)
- (iii) Image quality (week 1)
- (iv) Physics of Radiography (week 1)
- (v) X-ray (week 2)
- (vi) Computed Tomography (week 2)
- (vii) Physics of Nuclear Medicine (week 2)
- (viii) Mid-term Exam (7/14, Thu.)
- (ix) Planar Scintigraphy (week 3)
- (x) Single Photon Emission Computed Tomography and Positron Emission Tomography (week 3)
- (xi) Physics of Ultrasound (week 3)
- (xii) Ultrasound Imaging (week 3)
- (xiii) Physics of Magnetic Resonance (week 4)
- (xiv) Magnetic Resonance Imaging (week 4)
- (xv) Advanced MRI techniques (week 4)
- (xvi) Final Exam (7/29, Fri.)