Course Code: EE-812

Title: Medical Image Processing and Analysis

Credit hours: (3-0)

1. Objectives. The aim of this course is to provide an in-depth coverage of the advanced topics in medical image processing and analysis. The course will specifically focus on the two core area of medical image segmentation and registration. It will serve to prepare the students to undertake research and development of techniques related to medical image processing and analysis.

2. Text Books. Medical Image Analysis, 2nd Edition, Atam P. Dhawan, ISBN: 978-0-470-62205-6, Wiley-IEEE Press

3. Course Outline

Topics	Periods
Introduction to image processing and image analysis	2
Specifics of medical imaging and medical image analysis	2
Medical imaging modalities, basics of medical imaging physics	3
Medical image data formats	1
Foundations of 2D image processing	4
Foundations of 3D and nD image processing	4
Medical image segmentation	10
Medical image registration	10
Tissue characterization	4
Validation	2
Interdisciplinary character of medical image analysis	4
Total	46

4. Course Outcomes:

a. Identify major processes involved in formation of medical images
b. Recognize the imaging modality from their visualizations
c. Classify the various medical image processing algorithms
d. Describe fundamental methods for image enhancement
e. Enhance medical images using appropriate software
f. Visualize all types of medical image data

g. Appraise efficacy and drawbacks of several techniques for image segmentation

h. Acquire the fundamental concepts for texture analysis

5. Recommended Reading

a. Medical image analysis by Atam P. Dhawan

b. Digital image processing by Rafael C. Gonzalez

c. Image Processing, Analysis, and Machine Vision by Milan Sonka