Sample Brief Course Description	
Course title	Biomedical Digital Image Processing
Course code	BME 342
College	Engineering
Department / Program	Biomedical Engineering
Year/ Level	4/10th
Course Type	**A.** ☐ University ☐ College ■ Department ☐ Others b. ■ Required ☐ Elective
Credited Hours	4
Contact Hours	(LT: 3, LB: 2, TR: 0)
Pre-requisites (if any)	--
Co-requisites (if any)	---
Course description	Topics include: Digital image fundamentals: Introduction – Origin – Steps in Digital Image Processing – Components –Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization –Relationships between pixels - color models. Biomedical Image enhancement: Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering–Smoothing and Sharpening Spatial Filtering – Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain

	filters – Ideal, Butterworth and Gaussian filters. Biomedical Image restoration and segmentation: Noise models – Mean Filters – Order Statistics – Adaptive filters– Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation. Wavelets and image compression: Wavelets – Subband coding - Multiresolution expansions- Compression: Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding –Bit-Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards. Image representation and recognition: Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments- Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.
Course Main Objectives	1. Learn digital image fundamentals. 2. Be exposed to simple image processing techniques. 3. Be familiar with image compression and segmentation techniques. 4. Understand the potential of computers on medical images.
Learning Outcomes	Knowledge and Understanding: 1.Describe various concepts of digital image processing 2. Select suitable technique for accomplishing specific image processing task. 3. Illustrate the steps involved in processing digital images.
	Skills:--- 1.Analyze the performance of image processing techniques 2. Devise new ideas or tools to solve common issues in certain applications. 3. Assess the impact of digital image processing for medical applications.
	Values:--- 1. Communicate effectively on a team.