International Credit Mobility* of the *Erasmus+ Program, 2020-2023
Course Handout

Course Name: *Image Processing and Its Different Applications in Engineering*
Instructor: *Dr. Koushlendra Kumar Singh, NIT Jamshedpur, India*

Course Objective: To explore students' ability in different techniques of Image Processing and their engineering applications.

References:

1. Digital Image Processing: Rafael C. Gonzalez, Richard E. Woods, Third Edition, Pearson Education,
2. Fundamentals of digital image processing, Anil K. Jain, Prentice Hall
3. Digital Image Processing by William K Pratt

Pre-Requisites:

1. Basic concept of signal processing, High school mathematics, C/C++ programming skill, Probabilistic Methods, Basics of calculus

Course Plan: Lecture hall with a capacity of 96 students: **137Π39**

Serial No.	Topics	No. of Lectures	Date	Hour
1	Introduction to Image Processing Image Processing and related field, Fundamental Steps in DIP, Components of an Image Processing System	1-2	Τετάρτη 5/10	13-15
2	Classification of Image Processing operations Details of Image processing operations, , basic relationship, distance metrics, Arithmetic Operations, Logical operation, Set operation, Statistical Operation, Sampling and Quantization	2-3	Παρασκευή 7/10	13-16
3	Intensity Transforms and Spatial filtering Backgrounds, basics of intensity transforms and spatial filtering, Intensity transform function, Image negative, Log transformation, Power-low transformation, piecewise linear transformation, Histogram processing, Histogram Equalization, Histogram Matching, Local Histogram Processing, Histogram statics for image enhancement, Smoothing spatial filters, sharping spatial filters, The Laplacian, The Gradient, Unsharp masking	4-5	Δευτέρα 10/10	11-13
4	Filtering in the frequency domain Fourier Transforms and properties, Convolution, Correlation, 2-D sampling, Discrete Cosine Transform, Frequency domain filtering	6-7	Τετάρτη 12/10	13-15
5	Applications of Image Processing Image Processing in Medical Imaging, Wood Applications, Multiphase Flow, Satellite Imaging	8-10	Παρασκευή 14/10	13-16

Tel No+91 657-2373392|Fax-+91 657-2373246 | Email:-koushlendra.cse@nitjsr.ac.in | Address:- P.O.-NIT Jamshedpur, Adityapur, Distt- Saraikela Kharsawan- 831014, Jharkhand