

## DIGITAL IMAGE PROCESSING

**Subject Code: 10IS762**  
**Hours/Week : 04**  
**Total Hours : 52**

**I.A. Marks : 25**  
**Exam Hours: 03**  
**Exam Marks: 100**

### PART - A

**UNIT – 1** **6 Hours**

**Digitized Image and its properties:**

Basic concepts, Image digitization, Digital image properties

**UNIT – 2** **7 Hours**

**Image Preprocessing:** Image pre-processing: Brightness and geometric transformations, local preprocessing.

**UNIT – 3** **7 Hours**

**Segmentation – 1:** Thresholding, Edge-based segmentation.

**UNIT – 4** **6 Hours**

**Segmentation – 2:** Region based segmentation, Matching.

### PART – B

**UNIT – 5** **7 Hours**

**Image Enhancement:** Image enhancement in the spatial domain: Background, Some basic gray level transformations, Histogram processing, Enhancement using arithmetic/ logic operations, Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters. Image enhancement in the frequency domain: Background, Introduction to the Fourier transform and the frequency domain, Smoothing Frequency-Domain filters, Sharpening Frequency Domain filters, Homomorphic filtering.

**UNIT – 6** **6 Hours**

**Image Compression:** Image compression: Fundamentals, Image compression models, Elements of information theory, Error-Free Compression, Lossy compression.

**UNIT – 7** **7 Hours**

**Shape representation:** Region identification, Contour-based shape representation and description, Region based shape representation and description, Shape classes.

**UNIT – 8****6 Hours**

**Morphology:** Basic morphological concepts, Morphology principles, Binary dilation and erosion, Gray-scale dilation and erosion, Morphological segmentation and watersheds

**Text Books:**

1. Milan Sonka, Vaclav Hlavac and Roger Boyle: Image Processing, Analysis and Machine Vision, 2nd Edition, Thomson Learning, 2001.  
(Chapters 2, 4.1 to 4.3, 5.1 to 5.4, 6, 11.1 to 11.4, 11.7)
2. Rafael C Gonzalez and Richard E Woods: Digital Image Processing, 3<sup>rd</sup> Edition, Pearson Education, 2003.  
(Chapters 3.1 to 3.7, 4.1 to 4.5, 8.1 to 8.5)

**Reference Books:**

1. Anil K Jain, “Fundamentals of Digital Image Processing”, PHI, 1997, Indian Reprint 2009.
2. B.Chanda, D Dutta Majumder, “Digital Image Processing and Analysis”, PHI, 2002.

**GAME THEORY****Subject Code: 10IS763****I.A. Marks : 25****Hours/Week : 04****Exam Hours: 03****Total Hours : 52****Exam Marks: 100****PART - A****UNIT – 1****8 Hours**

**Introduction, Strategic Games:** What is game theory? The theory of rational choice; Interacting decision makers.

Strategic games; Examples: The prisoner’s dilemma, Bach or Stravinsky, Matching pennies; Nash equilibrium; Examples of Nash equilibrium; Best-response functions; Dominated actions; Equilibrium in a single population: symmetric games and symmetric equilibria.

**UNIT – 2****6 Hours**

**Mixed Strategy Equilibrium:** Introduction; Strategic games in which players may randomize; Mixed strategy Nash equilibrium; Dominated actions; Pure equilibria when randomization is allowed, Illustration: Expert Diagnosis; Equilibrium in a single population, Illustration: Reporting a crime; The