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|  | **Subject Name:** | | | | | **Image Processing and Computer Vision** | | | | | | | | | | | | | | | | | | **Subject Code:** | | | | | | | | TMC 303 (1) | | |
|  |  | | | | |  | | | | | | | | | | | | | | | | | |  | | | | | | | |  | | |
|  | **Course Name:** | | | | | Master of Computer Applications (MCA) | | | | | | | | | | | | | | | | | |  | | | | | | | |  | | |
|  |  | | | | |  | | | | | | | | | | | | | | | |  | | | | | | | | |  | | | |
|  | **1** | **Contact Hours:** | | | | | | | 45 | | |  | | | | | | | | | | | | | **L** | | 3 | | **T** | | | 0 | **P** | 2 |
|  | **2** | **Examination Duration(Hrs):** | | | | | | | | | | | |  | **Theory** | | | 0 | 3 |  | **Practical** | | | | | 0 | | 0 |  | | | | | |
|  |  |  | | | | | | | | | | | |  |  | | |  |  |  |  | | | | |  | |  |  | | | | | |
|  | **3** | **Relative Weightage:** | | | | | | | |  | | | **CWE:** | | | | 25 | **MTE:** | | | 25 | | **ETE:** | | | | 50 | | | |  | | | |
|  |  |  | | | | | | | |  | | |  | | |  | |  | | |  | |  | | | |  | | |  | | | | |
|  | **4** | **Credits:** | | | 0 | | 3 | |  | | | | | | |  | |  | | |  | |  | | | |  | | |  | | | | |
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|  | 5 | **Pre-Requisite:** | | | | | | | Basic Mathematics | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  |  | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | 6 | **Subject Area:** | | | | | | | Computer Science. | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  |  | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | 7 | **Objective:** | | | | | | To teach how to process and manipulate the digital image. | | | | | | | | | | | | | | | | | | | | | | | | | | |
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|  | 8 | **Course Outcome:** | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | A student who successfully fulfills the course requirements will be able to: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | **CO 1** | | apply knowledge of mathematics for image understanding and analysis. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | **CO 2** | | design and analysis of techniques / processes for image understanding. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | **CO 3** | | design, realize and troubleshoot various algorithms for image processing case studies. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | **CO 4** | | select the appropriate hardware and software tools (Contemporary) for image analysis. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | **Details of the Course:** | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | |
| **UNIT NO.** | | | **CONTENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | **CONTACT HOURS** | | | |
| **1** | | | Introduction and Digital Image Fundamentals Digital Image Fundamentals, Human visual system, Image as a 2D data, Image representation – Gray scale and Color images, image sampling and quantization | | | | | | | | | | | | | | | | | | | | | | | | | | | | 8 | | | |
| **2** | | | Image enhancement in Spatial domain: Basic gray level Transformations, Histogram Processing Techniques, Spatial Filtering, Low pass filtering, High pass filtering, Filtering in the Frequency Domain: Preliminary Concepts, Extension to functions of two variables, Image Smoothing, Image Sharpening. | | | | | | | | | | | | | | | | | | | | | | | | | | | | 8 | | | |
| **3** | | | Image Restoration and Reconstruction: Noise Models, Noise Reduction, Inverse Filtering, MMSE (Wiener) Filtering  Color Image Processing: Color Fundamentals, Color Models, Pseudo color image processing. | | | | | | | | | | | | | | | | | | | | | | | | | | | | 8 | | | |
| **4** | | | Image Compression: Fundamentals of redundancies, Basic Compression Methods: Huffman coding, Arithmetic coding, LZW coding, JPEG Compression standard  Morphological Image Processing: Erosion, dilation, opening, closing, Basic Morphological Algorithms: hole filling, connected components, thinning. | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | | | |
| **5** | | | Image Segmentation: point, line and edge detection, Thresholding, Regions Based segmentation, Edge linking and boundary detection.  Object Recognition and Case studies Object Recognition- patterns and pattern classes, recognition based on decision – theoretic methods, structural methods. | | | | | | | | | | | | | | | | | | | | | | | | | | | | 12 | | | |
|  | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | |
|  | | | **Total** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 45 | | | |
| **10.** | | | **Suggested Books:** | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | |
| **Sl. NO.** | | | **NAME OF AUTHORS/BOOKS/PUBLISHERS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | **YEAR OF PUBLICATION** | | | |
| 1 | | | Gonzalez & Woods, ―Digital Image Processing, 3rd ed., Pearson education | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2008 | | | |
| 2 | | | Jain Anil K., ―Fundamentals Digital Image Processing, Prentice Hall India | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2010 | | | |
| 3 | | | S. [AnnaduraiI](https://www.amazon.in/s/ref=dp_byline_sr_book_1?ie=UTF8&field-author=ANNADURAI&search-alias=stripbooks), Fundamentals of Digital Image Processing,,  Pearson education | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2006 | | | |