**LESS0N PLAN: 2023-24**

**Subject Name:** COMPUTER VISION AND ROBOTICS

**Class:** III B.Tech CSE(IoT)                                     **Faculty name:**  Mrs. P.Swaroopa

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| **SL. NO** | **UNIT**  **#** | **TOPICS AS PER SYLLABUS** | **TOTAL NO. OF CLASSES** |
| 1 | I | **CAMERAS**:Pin Hole cameras | 10 |
| 2 | **Radimetry-Measuring Light**:Light in Space |
| 3 | Light surfaces,Important special cases |
| 4 | **Sources,Shadows and Shading**: Qualitative Radiometry, Sources and Their Effects, |
| 5 | Local Shading Models, |
| 6 | **Application:** Photometric Stereo, , |
| 7 | **Interreflections:** Global Shading Models |
| 8 | **Color:**  The Physics of Color, Human Color Perception, |
| 9 | Representing Color, |
| 10 |  | A Model for Image Color, Surface Color from Image Color. |  |
| 11 | II | **Linear Filters:**  Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates, | 8 |
| 12 | **Edge Detection:**  Noise, Estimating Derivatives, Detecting Edges, |
| 13 | **Texture:**  Representing Texture, |
| 14 | Analysis (and Synthesis) Using Oriented Pyramids, , |
| 15 | Analysis (and Synthesis) Using Oriented Pyramids, , |
| 16 | Application: Synthesis by Sampling Local Models |
| 17 | Application: Synthesis by Sampling Local Models |
| 18 | Shape from Texture |
| 19 | III | **The Geometry of Multiple Views:**  Two Views, | 9 |
| 20 | **Stereopsis:**  Reconstruction, Human Stereposis, Binocular Fusion, Using More Cameras, |
| 21 | **Segmentation by Clustering:** |
| 22 | What Is Segmentation?, |
| 23 | Human Vision: Grouping and Getstalt, |
| 24 | Applications: Shot Boundary Detection and Background Subtraction, |
| 25 | Image Segmentation by Clustering Pixels, |
| 26 | Segmentation by Graph-Theoretic Clustering, |
| 27 | Revision |
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| 28 | IV | **Segmentation by Fitting a Model:**  The Hough Transform, Fitting Lines, Fitting Curves, Fitting as a Probabilistic Inference Problem, Robustness, | 9 |
| 29 | **Segmentation and Fitting Using Probabilistic Methods:**Missing Data Problems, Fitting, and Segmentation, The EM Algorithm in Practice, |
| 30 | **Tracking With Linear Dynamic Models:**  Tracking as an Abstract Inference Problem |
| 31 | Linear Dynamic Models, |
| 32 | Kalman Filtering, Data Association |
| 33 | Applications and Examples. |
| 34 |  | Revision |  |
| 35 | V | **Geometric Camera Models:**  Elements of Analytical Euclidean Geometry, Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations, | 9 |
| 36 | **Geometric Camera Calibration:**  Least-Squares Parameter Estimation, A Linear Approach to Camera Calibration, |
| 37 | Taking Radial Distortion into Account, Analytical Photogrammetry, |
| 38 | An Application: Mobile Robot Localization, |
| 39 | **Model- Based Vision:**  Initial Assumptions, Obtaining Hypotheses by Pose Consistency, |
| 40 | Obtaining Hypotheses by pose Clustering, |
| 41 | Obtaining Hypotheses Using Invariants, Verification, |
| 42 | Application: Registration In Medical Imaging Systems, Curved Surfaces and Alignment. |

**TEXT BOOKS:**

1. David A. Forsyth and Jean Ponce: Computer Vision – A Modern Approach, PHI Learning (Indian Edition), 2009.

**REFERENCE BOOKS:**

1. E. R. Davies: Computer and Machine Vision – Theory, Algorithms and Practicalities, Elsevier (Academic Press), 4th edition, 2013.