

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN COMPUTER ENGINEERING

### SEMESTER- VI

Subject Name: **COMPUTER GRAPHICS AND MULTIMEDIA**

| Sr. No. | Subject content  | Hrs. |
|---------|--|------|
| 1       | <b>Introduction to Computer Graphics</b><br>1.1 History of Computer Graphics<br>1.2 Graphics standard<br>1.3 Application of Computer Graphics  | 2    |
| 2       | <b>Output Primitives</b><br>2.1 Line drawing Algorithm<br>2.1.1 Simple Line Drawing Algorithm<br>2.1.2 DDA algorithm<br>2.1.2 Bresenham's Line Algorithm<br>2.1.3 Parallel Line Algorithm<br>2.2 Circle Drawing Algorithm<br>2.2.1 Mid-point circle algorithm<br>2.3 Filled Area Primitives<br>2.3.1 Scan Line polygon fill algorithm<br>2.3.2 Boundary Fill algorithm<br>2.3.3 Flood fill Algorithm | 6    |
| 3       | <b>2D Geometry</b><br>3.1 Basic Transformations<br>3.1.1 Translation<br>3.1.2 Rotation<br>3.1.3 Scaling<br>3.2 Matrix Representations and Homogeneous Co-ordinates<br>3.3 Composite Transformations<br>3.3.1 Translation<br>3.3.2 Rotations<br>3.3.3 Scaling<br>3.4 Other Transformation<br>3.4.1 Reflection<br>3.4.2 Zooming<br>3.4.3 Shear   | 6    |

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| 4 | <p><b>2D Viewing</b></p> <p>4.1 Viewing Pipeline</p> <p>4.2 Windows to Viewpoint co-ordinate transformation</p> <p>4.3 Clipping Operations</p> <p>4.4 Point Clipping</p> <p>4.5 Line Clipping</p> <p>    4.5.1 Cohen Sutherland Line Clipping</p> <p>4.6 Polygon Clipping</p> <p>    4.6.1 Sutherland Hodgeman Polygon Clipping</p> <p>4.7 Translation</p> <p>4.8 Rotation</p> <p>    4.8.1 Coordinate Axes Rotation</p> <p>    4.8.2 General Three Dimensional Rotations</p> <p>4.9 Scaling</p> <p>4.10 Projection</p> <p>    4.10.1 Parallel projection</p> <p>    4.10.2 Perspective projection</p> | 10 |
| 5 | <p><b>Multimedia</b></p> <p>5.1 Introduction to multimedia</p> <p>    5.1.1 Multimedia ,Hypertext, Hypermedia</p> <p>    5.1.2 Application of Multimedia in various fields</p> <p>        5.1.2.1 Education</p> <p>        5.1.2.2 Media</p> <p>        5.1.2.3 Home</p> <p>        5.1.2.4 Marketing etc.</p> <p>5.2 Storage medium,</p> <p>5.3 Representation medium,</p> <p>5.4 Transmission medium,</p> <p>5.5 Independent media,</p> <p>5.6 Combination of media,</p> <p>5.7 Integration, data characteristics,</p> <p>5.8 Transmission types i.e. asynchronous, synchronous</p>                  | 4  |
| 6 | <p><b>Sound / Audio ,Video &amp; Animation</b></p> <p>6.1 Basic concept of sound</p> <p>6.2 Computer Representation of sound</p> <p>6.3 Audio formats</p> <p>    6.3.1 MIDI concept</p> <p>    6.3.2 WAVE,MP3 ,MP4</p> <p>6.4 Concept of Images</p> <p>    6.4.1 Image types – captured images and stored images</p> <p>    6.4.2 Image formats - .JPEG, .BMP ,.GIF</p> <p>6.5 Concept of Video</p> <p>    6.5.1 Video formats</p> <p>6.6 Concept of Animation</p> <p>    6.6.1 Computer based animations</p> <p>    6.6.2 Animation languages.</p>  | 9  |

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|----------|---|-----------|
| <b>7</b> | <b>Data compression techniques</b><br>7.1 Storage requirements for Audio/ Video<br>7.2 Data compression techniques<br>7.2.1 Run Length<br>7.2.2 Arithmetic<br>7.2.3 Huffman<br>7.3 JPEG standard (Image encoding)<br>7.4 MPEG standard (Audio/Video encoding) | <b>5</b>  |
|          | <b>Total</b>  | <b>42</b> |

### LABORATORY EXPERIENCES

**Hrs.**

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| 1. Draw line using different line style                             | 4 |
| 2. Draw the circle using Brezenham algorithm                        | 2 |
| 3. Perform the operation of scaling for two dimension picture       | 2 |
| 4. Perform the operation of translation for two dimensional picture | 2 |
| 5. Perform the operation of rotation for 2-D picture                | 2 |
| 6. Perform the operation of shear transformation for 2-D picture    | 2 |
| 7. Perform the operation of windowing and clipping technique        | 4 |
| 8. To study about the computer representation of Audio.             | 2 |
| 9. To study about the Audio\ Video file formats                     | 2 |
| 10. To study about the Image file formats                           | 2 |
| 11. To study about the data compression techniques                  | 2 |
| 12. Develop Animation movie using flash.                            | 2 |

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Total 28

### Reference Books:

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| 1. Computer Graphics                     | Donald Hearn & M Paulin Baker<br>PHI |
| 2. Computer Graphics                     | Steven Harington MGH                 |
| 3. Multimedia                            | Parekh- TMH                          |
| 4. Multimedia Computing and Applications | Ralf Steinmetz (Pearson)             |
| 5. Multimedia and Computer Graphics      | D.P.Mukharjee                        |