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| **NAME OF DEPARTMENT:** | | | | | | | | | | | | | | | | | | | School of Computing | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **Subject Name:** | | | | | | | | | Computer Graphics | | | | | | | | | | | | | | | | | | | | | | | | | **Subject Code:** | | | | | | | | | TBC 601 | | |
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| **Course Name:** | | | | | | | | | Bachelor of Computer Applications (BCA) | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | | |  | | |
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| **1** | **Contact Hours:** | | | | | | | | | | | 45 | | | |  | | | | | | | | | | | | | | | | | | | **L** | | 3 | | | **T** | | 0 | | **P** | 0 | |
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| **2** | **Examination Duration (Hrs):** | | | | | | | | | | | | | | | | | | | | |  | **Theory** | | | | | 0 | 3 |  | **Practical** | | | | | 0 | | 2 | |  | | | | | |
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| **3** | **Relative Weightage:** | | | | | | | | | | | | |  | | | | | **CWE:** | | | | | | | 25 | | **MTE:** | | | 25 | | **ETE:** | | | | 50 | | | |  | | | | |
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| **4** | **Credits:** | | | | | | 0 | | | 3 | |  | | | | | | | | | | | | |  | | |  | | |  | |  | | | |  | | | |  | | | | |
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| **5** | **Semester:** | | | | | | |  | | | |  | | | **\*** | | |  | | |  | | |  | | | | | | | | | | | | | | | | | | | | | |
|  |  | | | | | **Autumn** | | | | | | | **Spring** | | | | | | | **Both** | | | | | | |  | | | | | | | | | | | | | | | | | | |
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| **6** | **Pre-Requisite:** | | | | | | | | | | | 1. **Knowledge of Computers** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **7** | **Subject Area:** | | | | | | | | | | | **Computer Application** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **8** | **Objective:** | | | | | | | | | | 1. To familiarize students with Computer Graphics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **9** | **Course Outcome:** | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | **CO1** Understand core concepts of computer graphics.  **CO2**  Understand and implement algorithms to draw graphic objects.  **CO3** Understand and implement 2 D transformation  **CO4** Understand and implement 3 D transformation  **CO5** Implement Clipping and filling of graphics objects.  **CO6** To describe the importance of viewing and projections. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **10** | | **Details of the Course:** | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Unit No.** | | | | **CONTENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **CONTACT HOURS** | | | | | | |
| **1** | | | | **Introduction to Computer Graphics:** Definition, Applications, Graphics Hardware, Display Devices: Refresh Cathode Ray Tube, Raster Scan Display, Plasma display, Liquid Crystal display, Plotters, Printers. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | | | | | | |
| **2** | | | | **Mathematics for Computer Graphics:** Point representation, Vector representation, Matrices and operations related to matrices, Vector addition and vector multiplication, Scalar product of two vectors, Vector product of two vectors. Parametric equations of lines and conics. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | | | | | | |
| **3** | | | | **Line Drawing Algorithms:** DDA algorithms, Bresenham’s Line algorithm. Circle and ellipse generation algorithm.**Clipping**:Point Clipping, Line Clipping. Polygon Clipping.**Filling:** Inside Tests, Flood fill algorithm, Boundary-Fill Algorithm and scan-line polygon fill algorithm. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | | | | | | |
| **4** | | | | **2D Transformation:** 2D transformation, Basic Transformations, Composite transformations: Reflection, Shearing, Transformations between coordinate systems. **3D Transformation**: 3D transformations, Parallel projection, Perspective projection, Visible lines and surfaces identification, Hidden surface removal algorithms. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | | | | | | |
| **5** | | | | **Animation:** Introduction to Animation, Principles of Animation, Types of Animation, Types of Animation Systems: Scripting, Procedural, Representational, Stochastic, etc.  GKS Standards, GKS Primitives – Polyline, Polymarker, and Fill area, Text, GKS Workstation and Metafiles. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | | | | | | |
|  | | | | **TOTAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **45** | | | | | | |
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| **11** | | **Suggested Books:** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | |
| **Sl. NO.** | | | **NAME OF AUTHORS/BOOKS/PUBLISHERS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **YEAR OF PUBLICATION/REPRINT** | | | | | |
| **1** | | | Donald Hearn and M. Pauline Baker, “Computer Graphics”, PHI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2008 | | | | | |
| **2** | | | **V.K.Pachghare**, “Computer Graphics”, Second Edition, Laxmi Publications | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2011 | | | | | |
| **3** | | | P. K. Singh, Rajendra Kumar, ”Computer Graphics (GBTU)”, First Edition, Vikas Publishing House Pvt. Ltd. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2010 | | | | | |
| **5** | | | Newman and Sproul, “Principle of to Interactive Computer Graphics”, McGraw Hill | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2005 | | | | | |