

Sant Gadge Baba Amravati University, Amravati

Part A

Faculty: Science and Technology

Programme: Bachelor of Computer Application (BCA)

Part B

Syllabus Prescribed for 3 Year BCA UG Programme

Programme: Bachelor of Computer Application (BCA)

Semester V

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Hours/Periods)
5BCA1	Computer Graphics	60 Periods

Course Objectives (Cos)

1. The main objective of the course is to introduce students with fundamental concepts and theory of computer graphics.
2. It presents the important drawing algorithms, polygon fitting, clipping and 2D transformation curves and an introduction to 3D transformation.
3. It provides the basics of OpenGL application programming interface which allows students to develop programming skills in Computer Graphics.

Unit	Content
Unit I	Introduction: History of computer graphics, Technologies related to computer graphics, Characteristics, Components, Advantages and Disadvantages, Applications of Computer graphics. Geometry and line generation: points and lines, planes and coordinates, Line segments, perpendicular line segments, vectors, pixels and frame buffers. (12 Periods)
Unit II	Geometrical Transformations: Co-ordinate systems, Homogenous co-ordinate systems, Two dimension transformations (rotation, scaling, shearing etc), The Window-to-Viewport Transformation, Raster scanning, CRT (Interface Design). (11 Periods)
Unit III	Drawing Algorithms: Line drawing algorithms, Circle drawing algorithms Clipping Algorithm (Sutherland-Cohen line clipping algorithm), Projection (Two-dimensional), B-spline curves, shadowing, Midpoint subdivision algorithm. (11 Periods)
Unit IV	Animation: Introduction, Types of animation, Animation tools- hardware and software, Tweaking, Morphing and its parts, animation Application. (11 Periods)
Unit V	Implementation in C: C programming for drawing 2 D objects: line, rectangle, arc, circle and ellipse. C Programming for 2-D and 3-D transformations that includes translation, rotation, scaling, reflection and shear. (11 Periods)
*SEM Assignment, Class test, Attendance, Seminar, Study tour, Industrial visit, Field work, Group discussion or any other innovative practice / activity	
<ol style="list-style-type: none"> 1. COs: To be able to draw upon foundational knowledge, learn, adapt and successfully bring to bear analytical and computational approaches on changing societal and technological challenges 2. Cos: To assess the curricular skills acquired by students at college level through Assignments, Unit test, Internal Test, Group Discussion / Seminar / Mini Project, Study Tour 	
**Activities	<ol style="list-style-type: none"> 1. Understanding the concepts of computer graphics. 2. Implementation of interactive computer graphics, two dimensional system and mapping 3. Implementation of most important drawing algorithm, two-dimensional transformation 4. Implementation of Clipping, Filling and an introduction to 3-D graphics. (4 Periods)

Course Material/Learning Resources

Text books:

- 1) Computer Graphics - Rogers

Reference Books:

1. Procedural & Mathematical Elements in Computer Graphics, Rogers, TMH
2. Computer Graphics, Hearn & Baker, PHI
3. Computer Graphics: A Programming approach - Steven Harington
4. Interactive Computer Graphics- Newmann and Sproul

Weblinks to Equivalent MOOC on SWAYAM if relevant:

1. <https://www.classcentral.com/course/swayam-computer-graphics-19828>
2. https://onlinecourses.swayam2.ac.in/ntr21_ed42/preview
3. https://onlinecourses.swayam2.ac.in/ntr20_ed15/preview
4. <https://www.careers360.com/courses-certifications/swayam-graphic-designing-courses-brp-org>
5. <https://quizxp.com/computer-graphics/>

Weblink to Equivalent Virtual Lab if relevant:

1. <http://vlabs.iitb.ac.in/vlabs-dev/labs/cglab/index.php>
2. https://www.tutorialspoint.com/computer_graphics/index.htm
3. https://www.tutorialspoint.com/computer_graphics/computer_graphics_quick_guide.htm
4. <https://www.graphics.cornell.edu/about/what-computer-graphics>

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:

1. <https://www.youtube.com/watch?v=NmMky9Pg8Yc&list=PLrjkTql3jnm9cY0ijEyr2fPdownH-0t8EY>
2. <https://www.youtube.com/watch?v=Kp8Za-JkRuc&list=PLBW4he7ty4QAThPNwvtvZc1Q4PjlwOIptU>
3. https://www.youtube.com/watch?v=W6yEALqsD7k&list=PL9_jI1bdZmz2emSh0UQ5iOdT2xRHFHL7E