COURSE TITLE	**COMPUTER GRAPHICS**
COURSE CODE	**01CE0615**
COURSE CREDITS	**3**

Objective:

1. The objective of this Course is to provide a combination of mathematics, computer science and creativity. It introduce the fundamental concepts and theory of computer graphics. It presents technical drawing, dimensioning and specifications which is useful for a student in preparing for career in graphics and gaming.

Course Outcomes: After completion of this course, student will be able to:

1. Understand the basics of computer graphics and its applications.
2. Apply various drawing algorithms and usage of different filling methods
3. Understand and implement appropriate algorithms to create and manipulate 2D objects.
4. Apply transformations to graphics display device and projections for display of 3D scene.
5. Compare different color models and color spaces and explain their applications in computer graphics.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Basics of Computer Graphics** Introduction to computer Graphics and its Applications, Principles of graphics and its significance, Graphics input and output device and Graphics software and standards, usage of Drawing instruments, Drawing and filling methods.	4
2	**Graphics Output Primitives** Point and Lines, Line Drawing Algorithms: Simple, DDA, Bresenham's Line Drawing algorithm, Circle and Ellipse drawing algorithm, Polygon drawing: Representation of polygon; Conventional methods for drawing polygons; Real time Scan Conversion and Run length encoding; Fill area primitives including scan-line polygon filling, inside-outside test, boundary fill and flood-fill, character generation.	8

Contents : Unit	Topics	Contact Hours
3	**2D Viewing and transformations** Viewing pipeline, Window-to-viewport transformation, 2-D Clipping, Cohen-Sutherland Line Clipping, Mid-point subdivision algorithm, Liang-Barsky clipping, Cyrus-Beck line clipping; Polygon Clipping: Sutherland-Hodgeman and Weiler-Atherton polygon clipping; Character Clipping.	8
4	**3D Transformations** Scaling, Rotation, Translation, Shearing, Reflection; Homogeneous coordinates, Composite Transformations. 3-D concepts and representation, Solid Body transformations, Projections: Perspective, Orthographic.	6
5	**Advanced Graphic methods and Color Models** Hidden Surfaces And Lines: Back-Face Algorithms, Z Buffers, Scan- Line Algorithms. Color models: properties of light, RGB, YIQ and CMYK color models.	4
Total Hours		**30**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Practical 1** Write a Program to draw a line using simple DDA algorithm	2
2	**Practical 2** Write a Program to draw a line using Bresenham’s Line algorithm.	2
3	**Practical 3** Write a Program to draw a Ellipse using Bresenham’s Line algorithm.	2
4	**Practical 4** Write a Program to draw a circle using Bresenham’s Circle algorithm.	2
5	**Practical 5** Write a Program to fill a Circle using Boundary Fill Algorithm.	2
6	**Practical 6** Write a Program to fill a Circle using Flood Fill Algorithm.	2
7	**Practical 7** Write a Program to implement line clipping using Cohen-Sutherland line clipping algorithm.	2
8	**Practical 8** Write a Program to draw a circle using mid-point circle algorithm.	2
9	**Practical 9** Write a Program to display simple Star shapes Using graphics primitives.	2
10	**Practical 10** Write a Program to display simple Car shapes Using graphics primitives.	2

MR. HARDIK AJAYBHAI DOSHI — DR. RAJENDRASINH BAHADURSINH JADEJA

Digitally signed by (Name of HOD) — **Digitally signed by (Name of Dean/ Principal)**

Marwadi University
Marwadi Chandarana Group
NAAC A+

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
11	**Practical 11** Write a program to perform shear transformation on a rectangle.	2
12	**Practical 12** Write a program to translate a triangle about the origin.	2
13	**Practical 13** Write a Program to rotate a triangle about a fixed point taken as one of the vertex of the triangle.	2
Total Hours		**26**

Textbook :

1 Computer Graphics, D.Hearn And P.Baker, - Pearson Eduction - C Version, 200

References:

1 Computer graphics Princples and Practice., Computer graphics Princples and Practice., James D. Foley, Andries van Dam, John F. Hughes, Steven K. Feiner,, Pearson Eduction, 2013

2 Computer Graphics,, Computer Graphics,, Sinha & Udai, TMH, 2007

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery

Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
20.00	20.00	20.00	15.00	15.00	10.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

1 https://www.nptelvideos.com/course.php?id=391

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