



PSN COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous) Melathediyoar, Tirunelveli - 627152

Department of Computer Science and Engineering

COURSE PLAN **(Regulation 2018)**

Version:1

Academic year:2023-2024(Even Sem)

Subject Name & Code	COMPUTER GRAPHICS AND MULTIMEDIA & 503017
CourseType	CorePaper
Programme	B.E.CSE(UG)
Year/Semester/Section	III Year/VI Semester CSE B
Nature of Course/Credit	Theory / 3
Course Coordinator	Ms. G. Booma, AP/CSE

Institution Vision	Emerge as a pioneer institute inculcating engineering education and skills, research, values and ethics.	
Institution Mission	IM-1	To achieve greater heights of excellence in technical knowledge and skill development through innovative teaching and learning practices.
	IM-2	To develop the state of art infrastructure to meet the demands of technological revolution.
	IM-3	To improve and foster research in all dimensions for betterment of society.
	IM-4	To develop individual competencies to enhance innovation, employability and entrepreneurship among students.
	IM-5	To instill higher standards of discipline among students, inculcating ethical and moral values for societal harmony and peace.

VISION AND MISSION OF THE DEPARTMENT:

Department Vision	To emerge as a preeminence program to produce quality Computer Science and Engineering graduates.	
Department Mission	DM-1	To enhance professional and entrepreneurial skills through industry institute interaction to enable them in getting better placement.
	DM-2	To promote research and continuing education.
	DM-3	To train the students according to their discipline to meet dynamic needs of the society.

1. Pre-requisite(if any) :

- Mathematics
- Design and Analysis of Algorithms

2. COURSE DESCRIPTION:

The importance of computer graphics lies in its applications. In engineering applications (e.g. automotive and aerospace), the ability to quickly visualize newly designed shapes is indispensable. Before the advent of computer graphics, designers built expensive prototypes and time – consuming clay models. Now, designers can interactively view and modify models of their shapes using a computer.

Here are common concepts found in computer graphics classes:

- Video Display Devices
- 2-dimensional objects and transformation
- 3-dimensional objects and transformation
- Color coding and models
- Projections

Computer graphics has also expanded the boundaries of art and entertainment. Movies such as Jurassic Park make extensive use of computer graphics to create images that test the bounds of imagination.

3. CAREER OPPORTUNITIES: (ONE OR TWO)

- Graphic Designer.
- Industrial/Product Designer.

4. SYLLABUS

UNIT - I	INTRODUCTION TO COMPUTER GRAPHICS	Hrs
	Graphics Systems: Video Display Devices – Types – Raster-Scan Systems and Random Scan Systems – Input Devices – Hard Copy Devices - Output Primitives and their Attributes - Refresh Cathode - Ray Tubes - Raster Scan Displays Random - Scan Displays - Color CRT Monitors - Flat-Panel Displays.	9
UNIT - II	GRAPHICS ALGORITHM	Hrs
	Line Drawing Algorithms: Line Equations-DDA Algorithm- Bresenham's Line Drawing Algorithm- Displaying Polylines- Parallel Line Algorithms - Setting Frame-Buffer Values – Circle Generating Algorithms - Properties of Circles -Midpoint Circle Algorithm – Ellipse Generating Algorithms - Properties of Ellipses - Midpoint Ellipse Algorithm.	9
UNIT - III	TRANSFORMATIONS AND CLIPPING	Hrs
	Two-Dimensional Transformations: 2D Scaling, Translation, Rotation - 2D Translation Matrix- Raster Methods for Geometric Transformations - Three-Dimensional Transformations: 3D Scaling, Translation, Rotation, Shear Transformations, Reflection - Projection, Parallel Projection, Perspective Projection – Clipping: Line, Polygon, Curve, Text – Cohen - Sutherland Line Clipping - Sutherland-Hodgeman Polygon clipping	9
UNIT - IV	VIEWING AND COLOR MODELS	Hrs
	Viewing Concepts - Viewing a 3D Scene - Depth Cueing - Identifying Visible Lines and Surfaces - Surface Rendering - 3D and Stereoscopic Viewing - B-Spline Curve - Bezier Surfaces - Color Models for Images – Classification of Color Models – Additive Versus Subtractive Color Models – CIE Color standards: XYZ, RGB, CMY, YIQ, HSV, and HSI Color Models	9
UNIT - V	MULTIMEDIA	Hrs
	Multimedia Basics – Multimedia Applications – Multimedia System Architecture – Evolving Technologies for Multimedia – Multimedia Data Interface Standards – Multimedia Databases- Compression and Decompression – Data and File Format Standards – Multimedia I/O Technologies – Digital Voice and Audio – Video Image and Animation – Full Motion Video – Storage and Retrieval Technologies	9

TOTAL:45Periods

5. Course Outcome(COs):CO1.....CO5(should follow Bloom's taxonomy)

CO's	CO-STATEMENTS	Blooms level	PO's
CO1	Understand the basic concepts and algorithms in Graphics	K1	1,2,3,4,12
CO2	Understand the concept of design an algorithm using primitives	K3	1,2,3,4,5,12
CO3	Analyze the various 2D and 3D concepts and understand how to design a Graphic Image	K4	1,3,9,12
CO4	Understand software technique for color models and its methods	K4	1,12
CO5	Remember the basic concept of Multimedia System Design	K5	1,3,12

6. Instructional Learning Outcomes (unitwise/assignments/tutorials)

Unit	Assessment Procedure
I	The outcome will be assessed through Attendance, Assignment-1, Classtest-1, MCQ Test, Continuous Assessment Test-I.
II	The outcome will be assessed through Attendance, Assignment-2, Classtest-2, MCQ Test, Continuous Assessment Test-I&II
III	The outcome will be assessed through Attendance, Assignment-3, Classtest-3, MCQ Test, Continuous Assessment Test- II
IV	The outcome will be assessed through Attendance, Assignment-4, Classtest-4, MCQ Test, Continuous Assessment Test-III
V	The outcome will be assessed through Attendance, Assignment-5, Classtest-5, MCQ Test, Continuous Assessment Test-III

7. Program Educational Objectives (PEOs)(max.4)

S.No	Topic	PEOs
PEO1	Fundamental Knowledge	Graduates will be able to perform in technical and managerial roles ranging from design, development and problem solving to suit to the industrial needs
PEO2	Career Development	Graduates will be able to successfully pursue higher education and also Graduates will have the ability to adapt, contribute and innovate new technologies in different domains of computer science & Engineering
PEO3	Social Identity	Graduates will be ethically and socially responsible engineers in computer science & Engineering disciplines

8. Program Outcomes (POs)(12 attributes)

PO's No	KNOWLEDGE	STATEMENTS
1	Engineering Knowledge:	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	Problem Analysis:	Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusion using first Principle so mathematics, natural sciences, and engineering sciences.

3	Design /Development of Solutions:	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	Conduct Investigations of Complex Problems:	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	Modern Tool usage:	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	The Engineer and Society:	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	Environment and Sustainability:	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for, sustainable development.
8	Ethics:	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and Team Work:	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	Communication:	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	Project Management and Finance:	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	Life-long Learning:	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

9. Program Specific Outcomes(PSOs)

PSO1	The computer science and Engineering graduates are able to analyze, design, develop, test and apply Management strategy, Mathematical concept in the development of computational solutions, make them expert in computer software and hardware.
PSO2	Develop their skills to solve problems in all area of programming concepts and adopt high environmental and social issues with ethics to manage different projects in inter-disciplinary field.

10. COandPOmapping

Course Outcomes	Program Outcomes												Program Specific Outcomes	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1														
CO 2														
CO 3														
CO 4														
CO 5														

Enter correlation levels 1,2 &3 defines:1-low,2-medium,&3-Strong

11. Text Books& Reference Books

S.No.	Name of the Book	Author/Publisher/Year/ Edition	Weblink
Text Books			
1	Computer Graphics with OpenGL	Donald D. Hearn, M. Pauline Baker, Warren Carithers, Fourth Edition, Pearson Higher Education, 2016 (Units 1-4).	https://doc.lagout.org/programming/OpenGL/Computer%20Graphics%20with%20OpenGL%20%284th%20ed.%29%20%5BHearn%2C%20Baker%20%26%20Carithers%202013%5D.pdf

2	ComputerGraphics Principles andPracticein C	Andries van Dam, F. HughesJohn;JamesD.Foley;Steven K.Feiner,FourthEdition,PearsonHigherEducation,2013(Unit 5).	https://ptgmedia.pearsoncmg.com/images/9780321399526/samplepages/0321399528.pdf
Reference Books			
1	ComputerGraphicswithMultimedia	ArunachalamRajaraman, FirstEdition,NarosaPublisher, 2009.	http://www.narosa.com/books_display.asp?catgcode=978-81-7319-477-1
2	IntroductiontoComputer GraphicsandMultimedia	AnirbanMukhopadhyay,Arup Chattopadhyay, SecondEdition,PHIPublication,2010.	https://www.goodreads.com/book/show/18894467-introduction-to-computer-graphics-and-multimedia

12. WebResources:(other thanNPTEL,SWAYAMandotherelearningresources)

S.No.	Topic	Weblink
1	2D Transformation	https://www.tutorialspoint.com/computer_graphics/2d_transformation.htm
2	3D Transformation	https://www.tutorialspoint.com/computer_graphics/3d_transformation.htm
3	Projection	https://www.javatpoint.com/computer-graphics-projection
4	OPEN GL	https://www.geeksforgeeks.org/getting-started-with-opengl/

13. E-learninglinks

1	OverviewofGraphicSystem	https://onlinecourses.nptel.ac.in/noc20_cs90/preview
2	ProjectTransformationsand ViewingPipeline	https://www.youtube.com/watch?v=ujT6nt_hHEc
3	Flatpaneldisplays	https://www.youtube.com/watch?v=udLm3vv3-U
4	GraphicsIntroduction	https://nptel.ac.in/courses/106102063
5	ComputerNetworksand InternetProtocol	https://onlinecourses.nptel.ac.in/noc20_cs23/preview

14. MAGAZINE&JOURNALS

Magazine	https://www.navkratis.com/wp-content/uploads/2015/06/Pyctotherm-General-Presentation.pdf
Journals	https://www.journals.elsevier.com/international-journal-of-refrigeration

15. LessonPlan

S.No.	Unit	Topic to be covered	Hours Needed	Mode of Teaching (BB/PPT /Others)	Text /Ref. Book
INTRODUCTION TO COMPUTER GRAPHICS					
1	I	Graphics Systems: Video Display Devices	1	BB	T1
2		Types—Raster-Scan Systems and Random Scan Systems	1	BB	T1
3		Input Devices-Hard Copy Devices	2	BB	T1
4		output primitives and their attributes	1	BB	T1
5		Refresh Cathode-Ray Tubes	1	BB	T1
6		Raster Scan Displays Random-Scan Displays	1	BB	T1
7		Color CRT Monitors-Flat-Panel Displays	2	PPT	--
GRAPHICS ALGORITHM					
8	II	Line Drawing Algorithms: Line Equations	1	BB	T1
9		DDA Algorithm	1	BB	T1
10		Bresenham's Line Drawing Algorithm	1	BB	T1
11		Displaying Polylines-Parallel Line Algorithms - Setting Frame-Buffer Values	2	BB	T1
12		Circle Generating Algorithms-Properties of Circles	1	PPT	T1

13		MidpointCircleAlgorithm	1	BB	T1
14		EllipseGeneratingAlgorithms-PropertiesofEllipses	1	BB	T1
15		MidpointEllipseAlgorithm	1	BB	T1
16		OpenGL-Transform*			
TRANSFORMATIONSANDCLIPPING					
17	III	Two-DimensionalTransformations:	1	BB	T1
18		2DTranslationMatrix-RasterMethodsforGeometric Transformations	1	BB	T1
19		Three-DimensionalTransformations	2	BB	T1
20		Projection,ParallelProjection,PerspectiveProjection	2	Web	--
21		Clipping:Line,polygon, Curve,Text	1	BB	T1
22		Cohen-SutherlandLineClipping	1	PPT	T1
23		Sutherland-HodgemanPolygonclipping	1	BB	T1
VIEWINGANDCOLORMODELS					
24	IV	ViewingConcepts-Viewinga3D Scene	1	BB	T1
25		DepthCueing-IdentifyingVisibleLinesandSurfaces- SurfaceRendering	2	BB	T1
26		3DandStereoscopicViewing	1	PPT	--
27		B-splinecurve- BezierSurfaces	1	BB	T1
28		colormodelsforimages	1	BB	T1
29		additiveversussubtractivecolormodels	1	BB	T1
30		CIEcolorstandards:XYZ,RGB,CMY,YIQ,HSV,andHSIcolor models	2	PPT	
MULTIMEDIA					
31		Multimediabasics–Multimediaapplications	1	BB	T2

32	V	Multimediasystemarchitecture	1	BB	T2
33		Evolvingtechnologiesformultimedia–Multimedia datainterfacestandards	1	PPT	--

34		Multimediatdatabases	1	BB	T2
35		Compressionanddecompression	1	BB	T2
36		Dataandfile formatstandards	1	BB	T2
37		MultimediaI/Otechnologies–Digitalvoiceandaudio	1	BB	T2
38		Videoimageandanimation–Fullmotionvideo– Storageandretrievaltechnologies	2	PPT	T2
39		ColorModelCombination*			
TotalHoursNeeded: 45+ 2*=47 Hours					

***ContentbeyondtheSyllabus**

Signature	Prepared by:	Approved by:		
Name :	Ms.G.Booma	Dr.M.Vargheese	Dr.S.P.Umayal	Dr.V.Manikandan
Designation:	Asst. Professor	HoD / CSE	Academic Dean	Principal
Date:				

16. Class Time Table

Hour/Da y	9.00 – 10.00	10.00 – 11.00	11.00 – 11.20	11.20 – 12.10	12.10 – 1.00	1.10 – 2.00	2.00 – 2.50	2.50 – 3.40	3.40 – 3.50	3.50 – 4.40
MON			BR EA K			LU NC H - BR EA K			B R E A K	
TUE										
WED										
THUR										
FRI										

17. Course Time table

Hour/Da y	9.00 – 10.00	10.00 – 11.00	11.00 – 11.20	11.20 – 12.10	12.10 – 1.00	1.10 – 2.00	2.00 – 2.50	2.50 – 3.40	3.40 – 3.50	3.50 – 4.40
MON			BR EA K			LU NC H - BR EA K			B R E A K	
TUE										
WED										
THUR										
FRI										

18. Content Delivery Methodologies

- ☐ Black Board
- ☐ Power point Presentation
- ☐ Group Discussion
- ☐ Seminar
- ☐ Web resource

19. Assignments

AssignmentNo	Description	CO	BL
1	I/O and Hardcopy Devices	CO1	2
2	DDA Line Drawing Algorithm Problem	CO2	3
3	3D Transformation	CO3	6
4	Projection	CO4	2
5	Classification of Color Models	CO5	3

20. Assignment Rubrics:

Quality	Marks
Submission on Date	2
Understanding	3
Solving skill/Presentation	3
End results with correct units/conversions/Conclusion	2

21. Mapping of CO to Assignment:

CO's	CO-STATEMENTS	A1	A2	A3	A4	A5
CO1:	Students get good understanding in the fundamental soft I/O and Hardcopy Devices	3	-	-	-	-
CO2:	Students get good knowledge of DDA Line Drawing Algorithm Problem	-	3	-	-	-
CO3:	Students get the basic concepts of 3D Transformation.	-	-	3	-	-
CO4:	Students get good knowledge in different types of Projection	-	-	-	3	-
CO5:	Students can able to understand Classification of Color Models.	-	-	-	-	3

22. Assessment Methodologies:

Assessment Tool			Description
	Internal Test		CAT-I, CAT-II, CAT-III average will be considered for 15 marks, MCQ 10

Direct Assessment (80%)	Assignments	40%	marks, Assignments-5 marks, Attendance 5 marks. Class test 5 marks
	End semester Examination	60%	100% for End semester Examination
Indirect Assessment (20%)	Course End Survey (80%)		At the end of Course completion will be evaluated Enclosed separately
	Exit Survey (20%)		At the end of the degree completion will be Evaluated

23. Distribution of portions for assessment tests

Assessments	Portion Covering Unit	% of weightage
CAT-I	Unit I & Unit II (50%)	12.5
CAT-II	Unit II (50%) & Unit III	12.5
CAT- III	Unit IV & V	12.5
Assignments	Unit-I to Unit-V	12.5
Class Test	Unit-I to Unit-V	12.5
MCQ	Unit-I to Unit-V	25.0
Attendance		12.5
End Semester	Unit-I to V	100

24. Mark Allotment for CO Assessment:

Cos	CAT -I	CAT -II	CAT -III	Assignment	MCQ	Attendance	Class Test	End Semester
CO1	30			5	10	5	5	20
CO2	20	20		5	10	5	5	20
CO3		30		5	10	5	5	20
CO4			30	5	10	5	5	20
CO5			20	5	10	5	5	20
AVERAGE	5	5	5	5	10	5	5	100

25. Lecturer Notes

Enclosed Separately

26. Content beyond syllabus

Unit II: **OpenGL-Transform**

UnitV: **ColorModelCombination**

27. Question Bank

Enclosed Separately

29. Students Name List

Sl.No	Roll No	Name
1	95222103049	NigilaKannan
2	95222103050	NimeshVarshan S
3	95222103051	PandiSelvam J
4	95222103052	Prabhu P
5	95222103053	Prakash Rajan K
6	95222103054	Prakash S
7	95222103055	Prasanna T
8	95222103056	Rajkumar M
9	95222103057	Rakesh S
10	95222103058	Ram Kumar G
11	95222103059	Ramakrishnan N
12	95222103060	Ramalakshmi S
13	95222103061	Ravikumar C
14	95222103062	Renukudevi B
15	95222103063	Rosan N
16	95222103064	Rose Mary J
17	95222103065	Sanjay Kumar R
18	95222103066	Sankar R
19	95222103067	Sathishkumar C
20	95222103068	Sathishkumar R
21	95222103069	Selvapriya R
22	95222103070	Selvaraj S
23	95222103071	Sembulingam S
24	95222103072	SenthurPandian T
25	95222103073	ShanmugaPriya M
26	95222103074	Siva Balan T
27	95222103075	Sivakumar S
28	95222103076	Sivasankari M
29	95222103078	Sri Ram N
30	95222103079	Srivarshini R
31	95222103080	Suba Sangeetha S
32	95222103081	Subalakshmi B
33	95222103082	SudharshaPraba U
34	95222103083	Valagurunathan S
35	95222103084	Vignesh G
36	95222103085	Vignesh T
37	95222103086	Vishnu Priya S
38	95222103087	Viswajith N
39	95222103088	Yogalakshmi K
40	95222103301	Mahalingam
41	95222103302	Manjunath

42	95222103303	Mohammed Abdulla
43	95222103304	Nirmal kumar
44	95222103305	Saravanakumar
45	95222103306	Simson Chelladurai
46	95222103307	Singaravelan