Name of Institute: IITE Indus University Ahmedabad
Name of Faculty: Prof Khushbu Maurya

Course code: IT0501
Course name: Computer Graphics
Pre-requisites: Basic Programming
Credit points: 3
Offered Semester: 5th

Course Coordinator (weeks 12)
Full Name: Prof Khushbu Maurya
Department with sitting location: 4th floor Bhanvar Building
Telephone:9998956100
Email: khushbumaurya.ce@indusuni.ac.in
Consultation times: 3.00 P.M. to 5.00 P.M. (Monday to Friday)

Course Lecturer (weeks 12)
Full Name: Prof Khushbu Maurya
Department with sitting location:4th floor Bhanvar Building
Telephone: 9998956100
Email: khushboomaurya.ce@indusuni.ac.in
Consultation times: **3**.00 P.M. to 5.00 P.M. (Monday to Friday)

Students will be contacted throughout the Session via Mail with important information relating to this Course.

Course Objectives

On completion of this course, a student will be familiar with Computer Graphics and able to develop a graphics-based application using computer graphics algorithms. Students will gain the skills and Project-based experience needed for entry into web application and development careers.

Course Outcomes (CO)

After successful completion of the course, student will able:

1. Have a basic understanding of the core concepts of computer graphics.
2. How I/O device actually work.
3. How actually object is drawn.
4. How different algorithm are used to draw the quality picture.
5. Student will learn how 3D objects are displayed.

6. How 3D object scaled, rotate and translate.

Course Outline

This course will provide the insights to the various display techniques and display devices up till date. Both hardware and software techniques are included. Software techniques to put and paint of any shape is explained. Also, all transformation techniques and advance topics of graphics are taught.

Method of delivery

(Face to face lectures, self-study material, Active Learning Techniques)

Study time

(How many hours per week including class attendance)

CO-PO Mapping (PO: Program Outcomes)

1 Program Outcomes (PO's)

Engineering Graduates will be able to:

- **PO1** **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2** **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3** **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.
- **PO4** **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.
- **PO5** **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- **PO6** **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.
- **PO7** **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.
- **PO8** **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO9** **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 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.

PO11 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.

PO12 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.

2. Programme Specific Outcome

Computer Engineering

1. To understand the principles and working of computer systems.
2. To Design and develop computer programs in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics.
3. Should able to understand the structure and development methodologies of software systems with the use of a various programming languages and open source platforms

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	√	√	√		√								√	√	
2	√	√			√								√	√	
3	√	√	√	√					√	√			√	√	
4		√	√		√				√		√			√	√
5			√	√	√				√		√			√	√
6	√	√	√											√	√

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

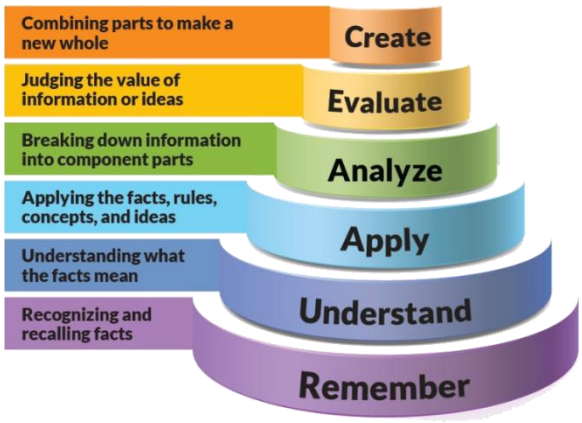

Figure 1: Blooms Taxonomy

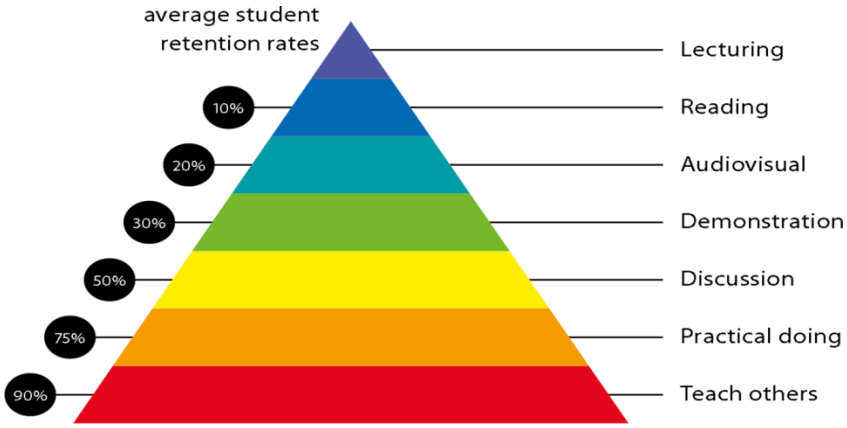

Figure 2: Knowledge retention

Practical work:

Wk No.	Class Activity	List of Practical
01	Lab 1	Study of various C graphics functions.
02	Lab 2	I. Write program to divide the screen into two parts horizontally. In first part draw equilateral triangle and in second part draw a smiley face. II. Write program to divide the screen into two parts vertically. In first part draw Kite and in second part draw any animating image.
03	Lab 3	Implement DDA line drawing algorithm.
04	Lab 4	Implement Bresenham's line drawing algorithm
05	Lab 5	Implement Mid-point circle drawing algorithm.
06	Lab 6	Implement Mid-point ellipse drawing algorithm
07	Lab 7	Implement algorithm for Character generation.
08	Lab 8	Implement Boundary-Fill algorithm to fill a polygon.
09	Lab 9	Implement Flood-Fill algorithm to fill a polygon.
10	Lab 10	Implement algorithm for 2D Transformation of an object. I. Translation II. Rotation III. Scaling
11	Lab 11	Implement Point clipping.
12	Lab 12	Implement Cohen-Sutherland line clipping algorithm.
13	Lab 13	Implement Liang- Braskly line clipping algorithm.
Practical Beyond syllabus		
14	Lab 14	Use concept of graphics and implement any application.
15	Lab 15	Use concept of graphics and make a video story.

Lecture/tutorial times

(Give lecture times in the format below)

Monday :12.20 – 01.20 p.m.
Thursday: 10.00 – 11.00 a.m.
Friday: 10.00 – 11.00 a.m.

per university norms is compulsory for being eligible for mid and end semester examinations.

Details of referencing system to be used in written work

Text books:

Text Books

1. Donald Hearn and M. Pauline Baker, Computer Graphics- C Version, PHI/Pearson Education

Reference Books

1. J. D. Foley, S. K Feiner, A Van Dam F. H John, Computer Graphics: Principles & Practice in C, Pearson Education

Additional Materials

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Theory:	***Practical:***
Class Test [40 Marks]	Practical performance [20 Marks]
Assignment [10 Marks]	Practical Minor project [20 Marks]
attendance bonus for all students having	regularity in Lab+ Practical
attendance > 80% [05 Marks]	Manual+ Viva [20 marks]
presentation [05 Marks]	

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in mid semester or end semester will be considered for supplementary assessment in the respective components (i.e mid semester or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (mid semester or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

Do not copy the work of other students.
Do not share your work with other students (except where required for a group activity or assessment)

Course schedule (subject to change)

(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Weeks 1	Display Techniques	1,2,6	Chalk & BB/Online Session with PPT
	Weeks 2	Output Primitives	2,3,4	Chalk & BB/Online Session with PPT
	Week 3	Mid Point Algorithm	*2,12*	Chalk & BB/Online Session with PPT
	Week 4	Polygonfilling Techniques	11,5	Chalk & BB/Online Session with PPT
	Week 5	2D Transformation	11,12	Chalk & BB/Online Session with PPT
	Week 6	2D Transformation	*11,7*	Chalk & BB/Online Session with PPT
	Week 7	3D Transformation	9	Chalk & BB/Online Session with PPT
	Week 8	Line Clipping Algorithms	9,10	Chalk & BB/Online Session with PPT
	Week 9	*Rotation*	*9,10,8*	Chalk & BB/Online Session with PPT
	Week 10	Bezier Curves	11	Chalk & BB/Online Session with PPT
	Week 11	Advanced Topics,	11,13	Chalk & BB/Online Session with PPT

	Week 12	RGB color Systems	11,13,6	Chalk & BB/Online Session with PPT

PROGRAM MAP for Bachelor of Engineering
(CE / CSE / IT)