Course Syllabus

STI VISION: To be the leader in innovative and relevant education that nurtures individuals to become competent and responsible members of society. **STI MISSION:** We are an institution committed to provide knowledge through the development and delivery of superior learning systems. We strive to provide optimum value to all our stakeholders - our students, our faculty members, our employees, our partners, our shareholders, and our community. We will pursue this mission with utmost integrity, dedication, transparency, and creativity.	**STI INSTITUTIONAL OUTCOMES:** **Character (IO1):** An STIer is a person of character. An STIer takes responsibility for his/her actions, treats people with respect, and lives with integrity. **Critical thinker (IO2):** An STIer is a critical thinker. An STIer challenges and analyses all information through sound questioning and is unafraid to push for creative ideas. **Communicator (IO3):** An STIer communicates to understand and be understood. An STIer discerns the value of information read or heard and effectively expresses his/her own emotions when sharing information, may it be spoken or written. **Change-adept (IO4):** An STIer is change-adept. An STIer can adjust, adapt, and reinvent continuously to changing circumstances. An STIer believes in letting go of the old and embracing the new to achieve his/her fullest potential.

SERIAL NUMBER: IT2202	**COURSE TITLE:** COMPUTER GRAPHICS PROGRAMMING	**CREDIT:** 2 lec 1 lab (2 hours lecture and 3 hours laboratory per week)
COURSE DESCRIPTION:	This course covers the introduction to the mathematics of computer graphics as well as how they are applied to created 3D graphics programs.	
PREREQUISITE:	Computer Programming 2	
COURSE OUTCOMES:	After successful completion of this course, the student should be able to: (PI1-ITPO01, PI2-ITPO02, PI3-ITPO05, PI4-ITPO07, PI5-ITPO09, PI6-ITPO10) CO1. Examine concepts and data structures to represent and manipulate geometry; CO2. Develop 2D and 3D computer graphics programs; and CO3. Implement various approaches and techniques in creating interactive applications.	
MANDATED BOOK:	None	
REFERENCES:	1. de Fine, M. (2018). *Python 2.6 graphics cookbook.* Packt Publishing. 2. Kelly, S. (2019). *Python, Pygame, and Raspberry Pi game development.* Apress. 3. Korites, B. (2018). *Python graphics: A reference for creating 2D and 3D images.* Apress. 4. Orland, P. (2019). *Math for programmers: 3D graphics, machine learning, and simulations with Python.* Manning. 5. Stemkoski, L. & Pascale, M. (2021). *Developing graphics frameworks with Python and OpenGL.* CRC Press.	

COURSE REQUIREMENTS:	• Class Participation *(Recitation, Seatwork, Quizzes)* • Major Examinations • Performance Tasks *(Laboratory Exercises, eLMS Activities, Projects)*
GRADING SYSTEM:	The following percentage distribution shall be followed: Prelims 20% Midterms 20% Pre-finals 20% Finals 40% 100% The following are the recommended periodical grade components for this course: Class Participation 20% Performance Task 50% Major Examination 30% 100%
We'd be glad to hear from you. For questions or feedback on this course, feel free to email us through student.feedback@sti.edu	

Course Outline

Learning Objectives (LO)		Week	LEC Hours	LAB Hours	TOPICS	Teaching and Learning Activities	Assessment Tasks
1 2 3	Describe the core concepts used in computer graphics (CO1) Compare the stages in the graphics pipeline (CO1) Set up a development environment (CO2)	**1-2**	**4**	**6**	**Introduction to Computer Graphics** Core Concepts The Graphics Pipeline	Lecture-Demonstration	01 Seatwork 1 01 Laboratory Exercise 1
4 5	Draw graphics in windows (CO2) Create animations and interactive applications (CO2)	**3-4**	**4**	**6**	**Pygame and OpenGL** Windows, Points, and Shapes Uniform Data Interactivity	Lecture-Demonstration	02 eLMS Quiz 1 02 Laboratory Exercise 1 02 Performance Task 1
		5			**PRELIMINARY EXAMINATION**		Pen and Paper Test
6 7	Perform vector addition and scalar multiplication (CO1) Add, subtract, and multiply matrices (CO1)	**6-7**	**4**	**6**	**Vectors and Matrices** Vectors Matrices	Lecture-Demonstration	03 Seatwork 1 03 Laboratory Exercise 1
8 9	Create matrices representing geometric transformations (CO1) Incorporate matrix objects into the rendering of interactive 3D scenes (CO2)	**8-9**	**4**	**6**	**Geometric Transformations** Scaling, Rotation, and Translation Projections	Lecture-Demonstration	04 eLMS Quiz 1 04 Laboratory Exercise 1 04 Performance Task 1
		10			**MIDTERM EXAMINATION**		Pen and Paper Test
10 11 12	Create the structure of a 3D graphics framework (CO2) Develop classes to generate geometric data (CO2) Render objects in the framework (CO2)	**11-13**	**6**	**9**	**A Scene Graph Framework** The Class Structure 3D Objects Geometry and Material Objects Rendering	Lecture-Demonstration Group Activity	05 Laboratory Exercise 1 05 eLMS Quiz 1 05 Performance Task 1
		14			**PRE-FINAL EXAMINATION**		Pen and Paper Test

13 14 15	Apply textures to the surfaces of geometric shapes (CO3) Create light objects of different types (CO3) Add shadow rendering capabilities to the framework (CO3)	**15-17**	**6**	**9**	**Textures, Lights, and Shadows** Textures Lights Shadows	Lecture-Demonstration Group Activity	06 Laboratory Exercise 1 06 eLMS Quiz 1 06 Performance Task 1
		18			**FINAL EXAMINATION**		Pen and Paper Test