Course Information

Course Number:	VIST 172
Course Title:	Foundations of Visual Computing
Section:	*501-505*
Lecture Time:	MW *8:00-8:50 AM*
Lecture Location:	HECC 108
Lab Time (501):	Tuesday-Thursday 08:00 AM-08:50 AM, ARCC 206C
Lab Time (502):	Monday-Wednesday 05:45 PM-06:35 PM, LAAH 242
Lab Time (503):	Friday 11:00 AM-12:40 PM, ARCC 206C
Lab Time (504):	Tuesday-Thursday 05:30 PM-06:20 PM, ARCC 307
Lab Time (505):	Monday-Wednesday 10:20 AM-11:10 AM, ARCC 307
Credit Hours:	3 (2-2)

Instructor Details

Instructor:	Suryansh Kumar
Office:	LAAH 202
Phone:	-
E-Mail:	suryanshkumar@tamu.edu
Office Hours:	By appointment

Course Description

Introduction to basic computer programming and mathematical concepts needed for developing solutions to visual computing problems. Includes a graduated series of hands-on programming assignments. Laboratories introduce scripting in a professional animation package and emphasize problem solving and debugging.

This course emphasizes hands-on experience in introducing the fundamentals of visualization software development using the Python programming language, with the turtle graphics module for 2D visualization, and the Python scripting interface to Maya. Emphasis will be placed on 2D concepts and techniques, while also providing some experience working in 3D. These principles provide the foundation for higher-level programming coursework and are the basis for highly sought-after skills within the animation, gaming, film, and related industries. This course is designed for undergraduate students with little to no prior experience in programming.

Course Requirements

The Visualization Program requires that all incoming students (Freshmen, Change of Majors, Transfer Students and Graduate Students) have a serviceable laptop computer and suggests the following minimum system configuration:
https://tamupvfa.b-cdn.net/app/uploads/2024/09/Laptop_Student_Requirements_2024.pdf

Course Prerequisites

Lower division in Visualization.

Course Learning Outcomes

Upon completing the course, successful students will:

- Recognize the basic organization of a computer
- Recognize the basic components of a computer program and how they interact
- Read and analyze foundation-level computer programs
- Design, program, and debug computer programs using a 2D graphics API
- Choose coordinate frames appropriate to a graphics problem
- Solve programming problems using trigonometric concepts
- Solve programming problems using points and vectors
- Solve programming problems involving scale, translation, and rotation
- Write introductory scripts in a professional 3D animation package

Textbook and/or Resource Materials

Textbook: *Think Python*, Allen B. Downey, O'Reilly Publishing

Web-based Resources:
- Python.org: A resource for all things Python
- W3 Schools Python Tutorial: A great set of tutorials with simple examples
- Python Turtle: Official Python Turtle documentation
- Autodesk Maya

Grading Policy

Grading will depend on your performance on a series of Programming Challenges, Lab Practicals, Quizzes, and Final Exam.

Attendance
- Attendance in lectures is the student's responsibility.
- Since Lab Practical grading will be done in lab, attendance is necessary to obtain credit.
- Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Programming Challenges
- There will be 7 Programming Challenges.
- Programming Challenges are graded on a 7-point scale.
- Each Challenge completed is worth up to 5 percentage points, to a maximum of 35.
- The candidate must submit the working Python code for each challenge, backed up with proper code comments. Additionally, the candidate must submit a supporting document with each challenge in .pdf format. This document should contain information about the candidate's approach to solving the programming challenge, supported by the intermediate or final result.

Lab Practical
- There will be 7 Lab Practical.
- Each Lab Practical is graded either completed or uncompleted, with no partial credits awarded.
- Practicals are considered completed if on time and perform the assignment requirements.
- Each completed Lab Practical is worth 5 percentage points, to a maximum of 35.
- Uncompleted Lab Practicals are worth 0 percentage points.

Quizzes

- There will be 15 Quizzes.
- Quizzes will be associated with the lectures and will cover the materials that the student needs to master for the topics covered during the week.
- Quizzes will be administered electronically in class, so students will receive immediate feedback as to the correctness of answers.
- A Quiz will consist of 4 questions, each worth ¼ percentage point, a completely correct quiz is worth 1.

Final Exam
- There will be a written final exam.
- The final exam will be graded on a 15-point scale.
- The final exam will be administered offline, and TAs and the Course Instructor will be present to monitor it. Teaching Assistants will correct the students' papers.

Grading Summary:
Table 1: Allotment of marks for each task

Task	Qty	Max %
Programming Challenges	7	35
Final Exam Written	1	15
Laboratory Practical	7	35
Quizzes	15	15
Total	-	100

Grading Scale:
A: 90-100
B: 80-89
C: 70-79
D: 60-69
F: < 60

Late Class Policy

Your instructors will make every effort to be in class on time or to inform you of any delay or cancellation. In the unusual event that they should not arrive in class or send word by 10 minutes from the class start time; the class is officially canceled.

Late Work Policy

Programming Challenges:
- Completed Programming Challenges must be turned in on Canvas by the due time. Each will be viewed and graded by a course TA or Instructor.
- Depending on a given situation and being highly dependent on a good-faith effort on the student's part, an instructor may extend a given programming challenge for an additional week on an individual basis. You must discuss this in person or via email with an instructor and should never assume in advance that an extension will be granted.

- No Late Submission of Programming Challenge will be accepted except for University or Department-approved reasons.

Lab Practicals:
- Completed Lab Practical must be turned in on Canvas by the due time. They will be reviewed and approved by the lab TA.
- Note that these Practicals are intended to be completed in the Lab session, so attendance is essential, except in the case of an exception approved ahead of time by the Instructor.
- Note that "completing" a Lab Practical means completing it correctly and turning it in on Canvas on time, except in the unusual case of an exception approved ahead of time by your lab TA. The only exception to this policy is University-approved absences. In this case, the student must arrange with the lab TA to have the work reviewed outside of the regular grading cycle.

Quizzes:
- Quizzes will be done in class and will be graded electronically.
- Except in the case of an exception approved ahead of time by an Instructor, late quizzes will not be accepted and will receive a grade of 0.

Deadline for Lab Practical, Programming Challenge, and Quiz
The Course Instructor or TA will supply the Lab Practical and Programming Challenge deadline once it is uploaded on Canvas. Meanwhile, the quiz submission deadline will be Wednesday at 11:59 p.m. and will be available online for students to take the quiz immediately after Wednesday's lecture. Note, however, that due to reading daybreak on the 26th of November, the last quiz will be on 8th of December 2025 (Monday) and its deadline will be 11:59 p.m. of the same day.

Work submitted by a student as makeup work for an excused absence is not considered late work and is exempted from the late work policy ([Student Rule 7](#)).

Course Schedule

Table 2: Course schedule with lecture, quiz, and lab practical details with apt date.

Week	Lecture	Laboratory and Programming Challenge	Quizzes
1	a. Course Overview b. Python and Editor Installation c. Computer Organization **Date: 25ᵗʰ Aug and 27ᵗʰ Aug**	**Lab 0** • Install and test Python and Maya on student machines (Non-Graded Lab)	Quiz 1
2	a. Introduction to Basic Python Programming b. Turtle Graphics in Python **Date: 3ʳᵈ Sept.**	**Challenge 1** • Draw something exercise	Quiz 2
3	a. Introduction to Colors b. List in Python c. List in Turtle Graphics **Date: 8ᵗʰ Sept. and 10ᵗʰ Sept.**	**Lab 1** • Maya: Introduction to Python scripting	Quiz 3
4	a. Strings, List, and Inputs.	**Challenge 2**	Quiz 4

	b. Conditionals and Booleans c. Loops in Python **Date: 15th Sept. and 17th Sept.**	• Sorting squares	
5	a. Range, Division and Modulo b. Coordinate frames **Date: 22nd Sept. and 24th Sept.**	**Lab 2** • Maya: Conditionals and loops in scripts	Quiz 5
6	a. More on Loops and Demo b. Fibonacci, Sorting a List c. Tuples and Polygons **Date: 29th Sept. and 1st Oct.**	**Challenge 3** • Drawing polygonal shapes	Quiz 6
7	a. Python Turtle: Text, Images b. Points, Vectors, and Lines c. Symmetry **Date: 6th Oct. and 8th Oct.**	**Lab 3** • Maya: Using lists in scripts	Quiz 7
8	a. Parametric Lines (starburst) **Date: 15th Oct.**	**Challenge 4** • Parametric lines	Quiz 8
9	**Trigonometry for graphics** a. Angles and Arc Length b. Trigonometric Functions and Pythagorean Identities c. Regular Polygon Turtle Demo **Date: 20th Oct. and 22nd Oct.**	**Lab 4** • Maya: Scripting scale and translation	Quiz 9
10	**Transformation I:** a. Scale and translation b. Combine scale and translation **Date: 27th Oct. and 29th Oct.**	**Challenge 5** • Drawing regular polygons	Quiz 10
11	**Transformation II:** a. Rotation b. Affine Transformation c. Basics of Matrix **Date: 3rd Nov. and 5th Nov.**	**Lab 5** • Maya: Scripting rotation	Quiz 11
12	**Functions I**: a. Scalar parameters & return values b. Procedural Transform Demo **Date: 10th Nov. and 12th Nov.**	**Challenge 6** • Procedural transforms	Quiz 12
13	**Functions II:** a. Variable Scope b. Lists and tuples as parameters and return values **Date: 17th Nov. and 19th Nov.**	**Lab 6** • Maya: Use of functions in scripts	Quiz 13
14	**File Handling**	**Challenge 7**	Quiz 14

	a. Open, close, read, write b. Exception Handling c. Drawing stored Model Demo **Date: 24th Nov. and 1st Dec.**	• Drawing a stored model	
15	a. Statistical Visualization b. Final: Written Exam **Date: 3rd Dec. and 8th Dec.**	**Lab 7** • Maya: Lights, cameras, and rendering	Quiz 15

Technology – Students are required to have their own laptop computers capable of running the course software (Python 3 and Maya). Laptops should be brought to class and lab. All Programming Challenges and Lab Practicals will be done on the student's own machines.

University Policies

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" (Student Rule 7, Section 7.4.1).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" (Student Rule 7, Section 7.4.2).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See Student Rule 24.)

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact the Disability Resources office on your campus (resources listed below) Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.
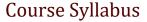
With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with Counseling and Psychological Services (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus

Students who need someone to talk to can contact Counseling & Psychological Services (CAPS) or call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.

Statement on the Family Educational Rights and Privacy Act (FERPA)

FERPA is a federal law designed to protect the privacy of educational records by limiting access to these records, to establish the right of students to inspect and review their educational records and to provide guidelines for the correction of inaccurate and misleading data through informal and formal hearings. Currently enrolled students wishing to withhold any or all directory information items may do so by going to howdy.tamu.edu and clicking on the "Directory Hold Information" link in the Student Records channel on the MyRecord tab. The complete FERPA Notice to Students and the student records policy is available on the Office of the Registrar webpage.

Items that can never be identified as public information are a student's social security number, citizenship, gender, grades, GPR or class schedule. All efforts will be made in this class to protect your privacy and to ensure confidential treatment of information associated with or generated by your participation in the class.

Directory items include name, UIN, local address, permanent address, email address, local telephone number, permanent telephone number, dates of attendance, program of study (college, major, campus), classification, previous institutions attended, degrees honors and awards received, participation in officially recognized activities and sports, medical residence location and medical residence specialization.

Use of Artificial Intelligence (AI) Tools and Models in the classroom, lab practical, and programming challenges or quizzes.

The use of AI tools for this course is not allowed. Any work (programming challenges, practical) submitted that is found to have been copied or replicated from AI models will not be accepted and shall be assigned 0 for the respective task. If any part of this is confusing or uncertain, kindly contact your instructor for a conversation before submitting your work.