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Course title and number	VIST 170: Introduction to Visualization Computing Environments
Term	Spring 2016
Meeting times and location	TBA 12:45-2:25 T Section 503

### Course Description and Prerequisites

Introduction to the procedures, practices and environments useful for problem solving using programmatic languages. Setup and use of the computing environment; useful system tools and commands; basic programming concepts and constructs.

Prerequisites: Bachelor of Science in Visualization Majors only.

### Introduction

Graphics software used for creating visual images in two and three dimensions is so sophisticated that most students rarely question the need to program. You may never have the depth of understanding or abilities of a computer science major, but programming is a tool, nothing more and there are lots of problems to explore and/or solve that are totally within the ability of the Visualization student. Many of these “interesting” problems relate to the creation of visual images; the domain of computer graphics. Even the most complex program, however, is based on a few logical constructions that are repeated over and over and in a variety of contexts. These constructs are really not difficult; the challenge is to apply them appropriately to solve the problem. Developing a program is really just a design problem; one that requires creativity and insight.

That's what this course is about – introducing the basic computing elements that will allow you to apply your creativity to solve visualization problems. Linux will be used as the programming environment as its power, flexibility and usefulness in graphics programming is greater than any other operating system. You may not have ever opened a terminal application on your system and executed commands on the command line. Why would you? But you will and hopefully will learn to appreciate this new capability.

There are many computing languages available that could be used to introduce the fundamentals of programming, but we will use a scripting language called Python3. Its one of the most popular languages in the visualization field but like any language, it has its own unique set of features and syntax. Of interest to us, however, is that Python shares the basic constructs with all(or at least most) procedural languages so by learning Python you will be able to translate much of you knowledge to other languages you may learn in the future.

### Learning Outcomes

At the conclusion of VIST 170, the student should be able to:

1. Explain computing terminology and principles relevant to computing for visualization.
2. Install, setup and use the Linux operating system as a virtual machine.
3. Explain and use the Linux command structure to manipulate files and directories.
4. Explain and utilize basic flow of control structures in the development of python scripts.
5. Explain and use basic data structures in the creation of python scripts.
6. Explain and utilize top down programming concepts in the development of python scripts.
7. Demonstrate the use of object oriented concepts in script development.
8. Employ simple debugging techniques useful in creating correct algorithms.

9. Develop a simple GUI using a graphics library.
10. Develop habits necessary for effective script development.

### Core Curriculum Learning Outcomes

	1	2	3	4	5	6	7	8	9	10
Critical Thinking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Communication	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teamwork	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Empirical and Quantitative Skills	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal Responsibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Social Responsibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Weave Assessment Learning Objectives

	1	2	3	4	5	6	7	8	9	10
To Stimulate Visual Thinking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
To Nurture Design Skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
To Enhance a Multidisciplinary Focus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To Encourage Collaborative Behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To Strengthen Ethical Behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
To Improve Personal Responsibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### Instructor Information

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### Textbook and/or Resource Material

The Linux Command Line, 2<sup>nd</sup>, Ed.

William E. Shotts, Jr.

LinuxCommand.org Book

Price: No charge under the Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 License

The Unix and GNU/Linux Command Line

Michael Opendacker & Thomas Petazzoni

Free Electrons, 2009

Price: No charge under the Creative Commons BYSA 3.0 license

Bash Reference Manual

Chet Ramey and Brian Fox

Reference Documentation for Bash

Price: No charge under the GNU Free Documentation License

A Byte of Python v1.92

Swaroop C H.

Price: No charge under the GNU Free Documentation License

Dive Into Python3

Mark Pilgrim

Price: No charge under the GNU Free Documentation License

### Grading Policies

Your grade will be based upon the following items:

11 Laboratory Assignments	55%
2 Quizzes	40%
Personal Evaluation/participation	<u>5%</u>
	100%

Laboratory assignments will be given to help you understand the concepts, processes and procedures used in the development of programs to solve relevant problems in visualization.

All laboratory assignments will be due at the beginning of class on the date indicated. **Late projects will result in a 5 point reduction each day the assignment is late except for reasons specified in the Texas A&M University Rules and Regulations.** All work should be handed in on the day specified, regardless of the level of completion.

The quizzes will be given over concepts, terminology and theory as described in class lectures, specified readings and handouts.

Assignments and quizzes will be based on 100 points for each. The grade for the semester will be calculated by adding all numerical grades and dividing by the total number of assignments and quizzes. The letter grade will be assigned using the following:

- A: 90-100
- B: 80 - 90
- C: 70 - 80
- D: 60 - 70
- F: below 60

### Attendance Policy

The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at <http://student-rules.tamu.edu>.

### Course Topics, Calendar of Activities, Major Assignment Dates

Week	Project	Lecture Topic	Reading	Course Objectives
1		Course introduction; Setting up Linux; Introduction to Linux		1,3
2	# 1 Issued	Basic Linux system administration; important system commands	TLCL: 13-24; 42-52 U/GLCL: 14-29	1,3
3	# 1 Due; # 2 Issued	The Linux file system; File and Disk management; Useful utilities	TLCL: 88-106 U/GLCL:32-35; 42-51	2,3
4	# 2 Due; # 3 Issued	Managing processes; The Linux Shell	TLCL: 108-121 U/GLCL: 52-58; 63-73; 78-82	2,3
5	# 3 Due; # 4 Issued <b>Quiz 1</b>	Setting up and Customizing the user environment;	TLCL: 123-135 U/GLCL: 83-88; 100-112; 122-133	2,3
6	# 4 Due; # 5 Issued	Introduction to Python, features and installation; using the Python interpreter	BofP: 15-25 DintoP: 3-32	3,4,5,6,7,8
7	# 5 Due; # 6 Issued	What are data types and why are they important? Numbers	BofP: 26-37 DintoP: 52-60; 106-125	3,4,5,6,7,8

8	# 6 Due; # 7 Issued	and strings; Operators and Expressions Flow of control - when consecutive execution of statements isn't enough; Decisions and loops	BofP: 38-44	1,2,3,4,5,6,7
9	# 7 Due; # 8 Issued	Python functions and Modules, one idea - one function; Scopes and arguments	BofP: 45-61	1,2,3,4,5,6,7
10	# 8 Due; # 9 Issued	Python data structures	BofP: 62-72 DintoP: 61-89	1,2,3,4,5,6,7
11	# 9 Due; # 10 Issued	Introducing GUIs; The Canvas Widget	TK 8.5: 5-17	1,2,3,4,5,6,7
12	# 10 Due; # 11 Issued	Other TK Widgets	TK 8.5: 18-38; 82-88	1,2,3,4,5,6,7
13	# 11 Due	Handling exceptions, bullet proof scripts	BofP: 93-97	1,2,3,4,5,6,7
14	<b>Quiz 2</b>			1,2,3,4,5,6,7

### Other Pertinent Course Information

#### Costs For The Course

Costs: The only cost for the course is for a flash drive or equivalent needed for backup of assignments and course related work. The total cost should not exceed \$15.00.

#### Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit <http://disability.tamu.edu>.

#### Academic Integrity

For additional information please visit: <http://www.tamu.edu/aggiehonor>

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

#### Statement of Responsibility

"It is unlawful for any person to damage or deface any of the buildings, statues, monuments, trees, shrubs, grasses, or flowers on the grounds of any state institutions of higher education (Texas Education Code Section 51.204)"

The words damage or deface refer specifically to any and all actions, whether direct or indirect, that either diminish the value or mar the appearance of the physical environment.