Technical Art & Direction

DPA 6820 FALL 2025

https://people.computing.clemson.edu/~ekp/courses/tad/

COURSE DESCRIPTION

This course focuses on conceptual and practical tools to create digital art and solve related challenges that arise in pipelines for animation, visual-effects, and game-development projects. It includes discussion, examples, and practice relative to technology used in the current production industry and is aimed toward developing interest and skills that could be used as a technical director or technical artist. Pre-requisite: some basic background in 3D graphics, production software, and programming.

CONTACT

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Class: 11-12:15 TTh
ZGEC 106 / MCA 110E

POTENTIAL RESOURCES

Maya Programming with Python Cookbook by Adrian Herbez.

On O'Reilly (free via Clemson access):

Practical Maya Programming with Python by Robert Galanakis.

Qt5 Python GUI Programming Cookbook by B.M. Harwani.

Modern PyQt: Create GUI Applications for Project Management, Computer Vision, and Data Analysis by Joshua Willman

Real-Time Visual Effects for the Technical Artist by Chris Roda.

GLSL Essentials by Jacobo Rodriguez.

HLSL Development Cookbook by Doreen Feinstein.

3D Math Primer for Graphics and Game Development by Dunn & Parberry.

GRADING

Assignments	80%
Tests	20%

ASSIGNMENTS

Roughly 8-10 assignments that consist primarily of implementations regarding class concepts and build toward practical problem-solving and tool creation that could be used in specific production areas.

LEARNING OUTCOMES

1. Understand and apply concepts of computing infrastructure used for production pipelines.
2. Understand and apply graphics, math, and software tools for creating visual art and solving production challenges.
3. Practice graphical user interface creation for production tools.
4. Practice programming related to digital-content-creation tools via scripting, application programming interfaces (APIs), and plug-ins for industry software packages.
5. Understand open and reference standards used in the production industry.
6. Implement practical problem solving and tool development for specific production tasks using all of the previously mentioned concepts.

TOPICS

Motivation; industry lingo; a toolbox of UNIX, math, 3D graphics, mapping functions, noise, simulation, Python, Qt, and other goodies; standards and trends for production; example production needs and challenges; in-application scripting, tool, and plug-in development for Maya and other packages; pipelines; shaders; and the kitchen sink if time.

TENTATIVE ASSIGNMENTS

- An argument for UNIX.
- Creating a graphical interface with Python and Qt.
- Showing off some graphics and math tools.
- Generative/procedural art creation.
- Basic simulation practice.
- Something with Python and Maya.
- Something with pipelines.
- Something with USD and possibly Katana and/or Solaris.
- Something using shaders in UE.
- Implementing a practical tool for DPA from a list of practical production challenges around our studio.

POLICIES

Your best attendance and involvement will be required to get the most from this course experience. Active engagement in all course elements is the only way to make this a meaningful learning experience to improve your understanding, thinking, and future capabilities. Students are individually responsible for keeping current with course material and assignments. Grading is much less important than learning but is required and will be based on an objectives met (check), objectives exceeded (check plus), or objectives not met (check minus) system. This is logically mapped to a letter grade (no plus/minus) at the end of the semester (all checks -> B; at least some check plusses -> A; multiple check-minuses -> C or below). Non-submissions receive zero credit which significantly lowers the grade mapping, and it is in best interests to submit assignments in a timely manner. This syllabus and course materials may be subject to change with reasonable notice.

BOILERPLATE

We will follow all the spirit and regulations of Clemson University regarding academic integrity, accessibility, inclusion, and any other fixed or changing policies. Please see associated Clemson University web pages for the most current policies and guidance, but above all, be a good person and active, involved student.

Tentative Schedule

AUGUST	**22**		
	Course introduction		
	26	**28**	
	Why UNIX? What's GNU? POSIX? Linux? BASH #!	UNIX commands and Bash scripting	
SEPTEMBER	**02**	**04**	A1: Get to know BASH
	How GUI applications work – event loop, events, widgets, layouts		
	09	**11**	
	Python, Qt, PySide 6 examples: color-picker widget		A2: Python Qt Files and 2D
	16	**18**	
	2D Image app and mapping functions in Python and Qt		
	23	**25**	A3: 1D and 2D Mapping Functions
	NumPy/CV Examples	Applied Graphics math	
OCTOBER	**30**	**02**	
	Applied Graphics math continued – points, vectors, transformations, products, trig, SRT…		
		16	
	FALL BREAK		
	21	**23**	
	Transformations; Noise/Patterns	Test 1	A4: Procedural Art Development
	28	**30**	
	Simulation fundamentals		
NOVEMBER	**04**	**06**	
	PyQtGL, shaders, and 3D file formats and standards		A5: 3D GL assignment
	11	**13**	
	Maya Python - architecture and scripting		A6: Maya Python scripts
	18	**20**	
	Maya Python - plugins		A7: Maya Python plugin
	25	***THANKSGIVING BREAK***	
	Color spaces, other		
	02	**04**	A8: Tool of choice
DECEMBER	Workshop	Test 2	

10 Final Exam 15:00-17:30