

Computer Graphics I

.5 credits 5 days/week

Course Syllabus

Instructor: Mr. Alesi, Mr. Donaldson, Mr. Olmsted

This semester course offers a fantastic way to be introduced to a variety of STEM engineering machines and tools, and computer graphic imaging software packages, and concepts. These software packages are used for 2D and 3D model animation, and image design. Software packages introduced in this course include: Adobe Photoshop, Premiere, and After Effects. Autodesk's 3D Studio is used for 3D modeling and animation. Makerware, and Cura software is used for creating 3D prints on our in classroom 3D printers, and Photoshop and Illustrator are used to create print and laser engraved projects. Solidworks will be introduced for future CAD skills. Throughout the course, you will be involved with hands-on experiences, creating desktop video with Adobe Premiere, Gaming level design with 3D Studio and Unity3D, original images for print using Adobe Photoshop, and Photograph repairs and enhancements using Photoshop. Concepts of STEM technology will be learned while each student works on his or her own high-end PC within the classroom. Each student will develop several 3D prints and laser engraved projects using our Epilog laser. The goal is to enhance and develop skills for all State High graduates as they enter an increasingly technological world. This course is a prerequisite for Computer Engineering Graphics 2.

Post-Secondary connections:

Architectural and Mechanical Engineering

Video/Film

Industrial Design

Video Game Design

Multimedia and Computer Animation

Computer Science

Information Systems Technology

Course content and unit activities:

Quiz 1 - Introduction to modeling terms and concepts, and additive manufacturing (3D printing) terms and concepts – General Pre-test (No grade) - 1 days, Post-Test (30 points)

Projects:

1. Intro to **3D Studio Max** (as a modeling and animation program) Ball, Box, and Cylinder with modifiers: Squash, Twist, and Bend. – 3 days (50 pts)

Concepts:

- Intro to the Graphical User Interface (GUI)
- Viewports and the Cartesian coordinate system
- Standard OS, and shortcut tools (i.e. Select, move, zoom)
- Object creation
- Object modification
- Naming and sizing objects
- Intro to timing of animated modifiers
- Rendering an image (file formats)

2. Ball in Box, with variations of design and animation – **3D Studio** – 2 days (50 pts.) *Concepts:*

- Control object motion using the "Track View"
- Control timing of animated objects
- Pivot points

3. Modeling a Chess Set – **3D Studio** – 1 ½ week (100 pts.) *Concepts:*

- Convert 2D shapes to 3D shapes
- Sublevels of shapes (splines and meshes)
- Expand on concepts of shape modification

4. Modeling a Rook – **Solidworks** – 2 days (100 points) *Concepts:*

- CAD design
- Tools – fillet, chamfer, revolve, extrude boss, extrude cut

- Creating sketches and features

5. Introduction to Additive Manufacturing (3D printing) – Chess Set – 3 days (mixed in with other content) (50 pts.)

Concepts:

- Preparing a file for print (.STL) file type.
- Use of shells, infill density, and layer resolution
- Heated bed vs. non-heated bed
- Use of supports and/or a raft
- 3D printer types

6. Creating a virtual game level and/or Architectural walk-through environment –**3D Studio** – 2 Weeks (100 pts)

Concepts:

- Materials and textures
- Named group sets
- Use of cameras and lights
- Using the walk-through assistant
- Rendering in common, shareable formats

Quiz 2 – Modeling terms and concepts, and additive manufacturing (3D printing) terms and concepts – General Post-test (50 pts)

7. Introduction to Photo manipulation using **Adobe Photoshop** 1 week (100 pts) *Concepts:*

- Common picture fixes
- Useful enhancements
- Creating original graphics with effects
- Use of layers

8. Mouse pad, Poster or T-shirt design – **Adobe Photoshop** – 1 ½ weeks (100 pts) *Concepts:*

- Intro to a digital still camera and scanner
- Create and use layers
- Image size relationships
- Aesthetics of an image
- Filters and effects

9. Wrench and Glasses/Pencil Box Desing – **AutoCad** – 1 weeks (75 pts. each) *Concepts:*

- Use of layers
- Annotating dimensions
- Drawing geometric lines, arcs, circles
- Line thickness (cutting vs. etching)
- 2D subtractive manufacturing

10. Laser Engraver/Cutter project - **Adobe Photoshop** – 3 days (75 pts) *Concepts:*

- Raster graphics vs. vector graphics
- CNC control of a machine using graphics
- Connection to additive manufacturing

11. Special Effect Video Graphics with **Adobe Photoshop to After Effects** – 1 ½ weeks (100 pts) *Concepts:*

- Setting up a Comp
- Controlling layers
- Use of effects over Time
- Animating layers using keyframes

12. Introduction to Video Game Design **Unity3D** - 1 week (100 pts.) *Concepts:*

- Creating models, lights, and using sounds
- Programming in Java or C#
- Tying code to the modeled environment.

13. Culminating Video of Project Highlights - Non-linear editing– **Adobe Premiere** – 1 week (100 pts) Concepts:

- Use of screen grab utilities
- Converting sound
- Use of transitions
- Creating fades and blends
- Working with file formats and screen size
- Using credits and titles
- Animating artwork
- Creating buttons
- Application of filters and processes on clips to achieve a desired effect
- Movie types – .avi, .swf, .mov. Rendering codecs (Compressor/Decompressor)

Class participation and attendance will account for *50pts. per marking period*

Relevant Class Resources:

Mr. Troy Alesi taa11@scasd.org www.scasd.org/teched/troyalesi <http://www.scasd.org/teched/podcasts>
www.students.autodesk.com (for free software for 3 years,) www.kuler.adobe.com
www.adobe.com www.autodesk.com

30 day trials can be downloaded for all of the Adobe programs. You could time these downloads with our

units. General Classroom Guidelines and Notes:

- **Grades are posted in Home Access.**
 - **Unit completion dates are flexible. Updates to class schedule will be posted on the teacher web page calendar.**
1. No Cell phone or media device use in class, other than in class computers.
 2. No food in the classroom.
 3. Drinks are permitted (in a container with a lid)
 4. You may use the in class printers for printing school related papers (before or after class, Color LaserJet 150).
From a Google Doc, use the option to **Print from my computer.**
 5. No hats in the classroom.
 6. No games played on in class computers (except free day Fridays, once a month)
 7. No software loaded on in class computers