

Design and Technology Academy (DATA)

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3D Modeling and Animation

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Course Syllabus 2021 – 2022

COURSE DESCRIPTION:

In this course students will learn the concepts of 3D Modeling and animation and how to apply those concepts in the programs we will be using in class. The main program will be Autodesk Maya which is used in many of the animation studios around the world. Our focus will be designing and creating 3D models and a little bit on animation. We will learn how to create 3D models, how to UV the models, texture and export them. We will use Arnold in Maya and Unreal Engine to render these models. We will build some scenes and learn about lighting in Unreal Engine. We will also use ZBrush and Blender a little later in the year. For texturing we will use the Quixel suite of software.

If possible, I strongly encourage students to have a computer that can run these programs and install them at home. Especially if Game Design, Animation, Architecture, Graphic Design, or Video Production is something they want to pursue as a career. Most gaming computers can run these programs. The programs are all free to download and use at home. Some of these programs have a limited use requirement meaning that they are free for use if the programs are used for educational purposes only.

Again, it is NOT a requirement to have a computer or download this software at home.

Here are the websites where these programs can be downloaded:

Unreal Engine: <https://www.unrealengine.com/en-US/get-now> (select the Publishing License)

Visual Studio 2019: <https://visualstudio.microsoft.com/vs/> This program is used for programming in C++ for Unreal Engine. We will not be using it in this class, but you can download it if you wish.

Blender: <https://www.blender.org/>

Quixel: Set up your Unreal Epic Games account first, then sign in using your Epic Games Login.

Once signed in go to both and install them:

Quixel Bridge: <https://quixel.com/bridge>

Quixel Mixer: <https://quixel.com/mixer>

Autodesk Maya: <https://www.autodesk.com/education/free-software/maya> Once here you will need to create an account. Ask me which version we are using in class. You can download any version you wish and can have multiple versions installed.

All these programs work for both Mac and PC. All work can be completed at school in the D24 computer lab. Again, it is NOT a requirement to have a computer or download this software at home. However, if you are taking these classes online, then you will need to remote into the on-campus computers using the NEISD provided laptops. Personal laptops will not be able to remote into NEISD computers.

Core Learning Goals:

1. The student will learn how to create 3D models.
2. The student will learn how to create UVs and textures to add details to 3D models.
3. The student will learn how to render the 3D models using different software.
4. The student will learn how to use Unreal Engine to place their model in a scene and how to manipulate the model.
5. The software the student will begin to learn are Maya, Quixel, and Unreal Engine. Depending on time, we will also cover some or all the following software: Unity, ZBrush, 3Ds Max, and Blender.

Classroom Rules:

1. Be on time to class
2. Be ready for class
3. Be respectful to everyone's
 - a. Ideas
 - b. Time
 - c. Space
 - d. Things
4. Turn work in on time
 - a. Projects in this class take practice and time
 - b. When you are in my class, you only work on assignments for my class
 - c. If you are "done early", refine your project and make it better. Practice makes your work better.

Consequences for Not Following Classroom Expectations (including tardiness):

1. 1st infraction: You will receive a verbal warning.
2. 2nd infraction: Conference with teacher.
3. 3rd infraction: Conference with teacher and a phone call to Parent or Guardian.

Classroom Procedures:

1. Walk in and immediately take your seat. If we are working on projects, get started immediately. We only have 52 minutes a day to accomplish what game designers in the business accomplish using many hours a day over weeks and months. We do not have time to waste.
2. All class work will be assigned through Microsoft Teams. I will add students to Teams which will send a link to their student emails. Students check your school assigned email and Teams daily for assignments and updates. Students will have access to Teams on school computers. They will also have access to Teams and other Microsoft Office 365 programs online from any other computer, tablet, or smartphone by signing into Office 365 with their student login email address and password or from the NEISD Launchpad (<https://launchpad.classlink.com/neisd>). Here is the link to [Office 365](#). We will go over Teams in class to make sure everyone can sign in, understands how to use it, and understands the expectations. After that, check Teams daily for updates, new material, tips, and links.
 - a. **Parents:** Please provide your preferred email address to me so I can invite you to our OneNote Class Notebook (Which is part of Teams). This will enable you to log in and see what your student is doing in our class and to follow along with our projects, schedules, and assignments.
3. Follow the classroom rules while in my class. They are not negotiable. I will communicate with parents regularly and I am available to answer questions at any time in class. Outside of class or for parents, the best way to contact me with questions is through my email address, pfritz@neisd.net.

Tardy Procedure:

1. If you walk into class tardy without a valid pass, you will be sent back to get a pass. Tardiness is also a loss of time, which you will need to make up.
2. If you have a pass, do not disturb the classroom environment. Provide your pass and continue with the classroom flow.

Hall Pass Procedure:

1. No hall passes will be issued during the first 15 minutes, or the last 15 minutes of the class period.
2. No hall pass will be issued during the instructional period (when teacher is explaining the class work procedures for the class period).
3. Students are not allowed to walk out of class without a hall pass.

Small Group Procedure:

1. When an assignment requires group work, you will receive instructions on the assignment first.
2. Group assignments are a two-part grade: One part is based upon your individual group participation and involvement. The second part is based upon the actual completed work.
3. All individuals in the group must have a valid role in the group process. No role, no grade.

4. Group members will be assigned by the Teacher.

Classroom Expectations:

1. Come to class prepared every day and be in your seat when the bell rings.
2. Raise your hand when you want to speak in class.
3. Absolutely no eating, drinking, or chewing gum in the classroom. Water bottles with a lid will be allowed.
4. Always show respect for others and yourself.
5. Follow all classroom policies in addition to the rules of the Student Behavior Code of Conduct.
6. While in class, do not make or receive phone calls, write, or receive texts, watch videos, snapchat, Facebook, or any other form of social media, and distraction while in class. The only exception is to watch tutorial videos for the class work while working. Failure to follow this rule will require you to place your phone on my desk during each class period.
7. The use of devices to listen to music while working is allowed, but earbuds or headphones must be used. Not everybody in class will want to hear your style of music.
8. Please do not have earbuds or headphones over your ears while I am giving instruction. I will revoke your music listening privileges for the rest of the class. If it is a reoccurring issue, you will not be allowed to use your device in class.
9. The charging of Personal Electronic Devices using the classroom electrical outlets is allowed, but do not unplug any computers or other classroom devices to gain access to an outlet.
10. The computers in class are not meant for your use of social media or watching the latest YouTube video. Yes, we will be using YouTube and some other media for instruction, but those are the only authorized uses on those sites. You will only use the computers for their intended class purposes.

Make-up Work for Absences:

According to Board Policy, students are required to make up assignments, homework, projects, quizzes and tests missed due to absences.

NEISD distinguishes absences as excused and unexcused. Make-up work for excused absences will be eligible for full credit. Students shall receive a 20% deduction from the total grade earned for any assignment or assessment not made up within the allotted time. A truant absence is an unexcused absence with disciplinary consequences. Make-up work for unexcused absences will be penalized equal to late work. A 20% deduction from the total grade earned will be taken on make-up work for unexcused absences.

1. Students will be allowed reasonable time to make up assignments, homework, projects, quizzes and tests missed due to absences.

- a. At the secondary school level, reasonable time is defined as one class day per class missed, e.g. a student who misses class on Tuesday has until the beginning of class on Thursday to turn in make-up work.
 - b. For extended absences, make-up assignments shall be made available to students after two consecutive class days of absence.
 - c. Teachers will provide the assignments to the students and inform students of the time allotted for completing make-up assignments, homework, projects, quizzes and tests.
 - d. It is the student's responsibility to obtain, complete and submit the missed work in the time allotted.
2. Students will not be required to take a quiz or test on the day returning to class from an absence if the quiz or test was announced during the student's absence.
 3. After their return to class, teachers are required to make arrangements with the student within two class days to take a test/quiz if the test/quiz was announced during the student's absence.
 4. Make-up work and tests for all absences should be of the same rigor, but not necessarily the same format, as the original activity, assignment or test.
 5. Make-up tests or presentations may be scheduled before school, after school, during study hall or during the student's class period, at the teacher's discretion to ensure that new and/or significant content is not missed.
 6. Students should make prior arrangements with teachers for making up missed work when the absence can be anticipated, e.g., a dental appointment, court appearance or appointment, approved school-related activities, etc.
 7. After a prolonged absence, the teacher has the right to exempt a student from some assignments if the teacher determines that doing so will not have a negative impact on the student's ability to master the content or unfairly bias his/her grade.
 8. NEISD shall not impose a grade penalty for make-up work after an absence because of suspension.

Late Work:

1. Late work is defined as any assignment that is not submitted on the due date and class period with the exception of make-up work for absences or approved school activities.
2. A 20% deduction from the total grade earned will be taken for late assignments.
3. Late assignments will be accepted until the material has been assessed summatively or within a three-week grading period.
4. Extenuating circumstances may occur that prevent the completion and turning in of assignments on the due date. It is the parent/guardian and/or student's responsibility to inform the teacher and/or an

appropriate administrator of any such circumstances so that an exception to the rule may or may not be granted. The teacher and/or appropriate administrator shall have the authority to render a final decision on the granting of any exceptions.

REQUIRED MATERIALS FOR CLASS:

1. My intent is to have as much of the class online in Teams. However, some paper will be needed to take notes, make sketches, develop ideas, concepts, and to storyboard. - Students should have a notebook of their choosing that allows them to do this. There are tablets and other touch screen devices that will work for this as well and are an acceptable option, but they are **NOT required**.
2. A pencil with an eraser is required for sketching ideas and concepts. The process of sketching ideas and story boarding is usually done in pencil and then inked in and the pencil lines are erased for the final copy. This is not a drawing class, but if students wish to follow this process, then they will need pens for this as well. **Only the pencil and eraser are required.**
3. Spiral notebook, Loose-leaf paper, or Sketchbook.
4. All work will be required to be backed up. Saving work on a computer as the only copy is not a good idea. We have issues from time to time on our computers and students have lost work as a result. Students can save their work on OneDrive, Google Drive, a Flash Drive, or some other form of a portable hard drive or cloud backup. Remember, save your work, back it up, and do this often. Our projects take many hours to complete and losing your work will require you to redo it all. Losing your work **is NOT** an acceptable excuse for turning it in late.

Grading Policy:

• Projects	40%
• Exams	25%
• Quizzes	20%
• <u>Homework</u>	15%
Total	100%

3D Modeling

Lesson Calendar – 1st Semester

Week 1: 16 – 20 August

Introductions

Syllabus and class expectations

Teams – What it is and how we will use it

Introduction to design concepts for 3D

Maya – Learning the Interface and How Maya Works

Week 2: 23 – 27 August

Research and draw a Bug

Faces, Edges and Vertices

Learning How to Think in Shapes - Making a simple bug in Maya

Week 3: 30 August – 3 September

Making a simple bug in Maya

Rendering the Bug in Arnold

Week 4: 6 – 10 September

6 September – Holiday (Labor Day)

Combining and Separating Shapes in Maya

Make a simple house using basic shapes

Week 5: 13 – 17 September

Target Weld Vertices and Edges, Bridging, and Extruding

Edge Loops, Connect, and Multicut Tool, Bevel Tool

More Maya tools and menus

Week 6: 20 – 24 September

Draw a room in your house with detail

Make the room starting with a cube

Week 7: 27 September – 1 October

Make the room starting with a cube

UVs

Introduction to Quixel

Adding Color ID to your building in Maya

Exporting your building to Quixel Mixer

Adding textures to the room

Week 8: 4 – 8 October

Render your room in Unreal Engine

Making a vase - Adding detail models to your room

Make a simple curio box

Add textures to your models and render using Arnold

Week 9: 11 – 15 October (end of 1st quarter)

11 October – School Holiday

Draw a piece of furniture for your room

Knowledge test over 1st quarter learning

Hands on test demonstrating knowledge application

Week 10: 18 – 22 October

Draw a TV you want to put in your room

Create the TV in Maya

UV your model

Color ID you model

Use mixer to add textures to your TV

Render your TV in Arnold

Week 11: 25 – 29 October

Draw two more objects for your room

Create these two models for your room

UVs, Color ID, and Texture your models

Render your models in Arnold

Week 12: 1 – 5 November

Combine all of your models into your room in Unreal Engine

Render your model in Unreal Engine

5 November – STEAM Carnival (Show off Models in Pictures or VR?)

Week 13: 8 – 12 November

Draw a mechanical vehicle used for transportation (This is your semester final project, there will also be an exam during finals week)

Start modeling your model in Maya

Week 14: 15 – 19 November

Finish your model

Uv your model

This time we will add materials to our model in Maya and will texture it in Unreal Engine using Bridge (So, no Color ID this time)

Week 14: 22 – 26 November

Thanksgiving Holiday!

Week 15: 29 November – 3 December

Finish preparing your model for export to Unreal Engine

Setup your scene in Unreal

Render your model in Unreal

Week 16: 6 – 10 December

Setup cameras in Unreal for a video rendering

Animate the scene and render

Week 17: 13 – 17 December

Final Review

Finals (Written or hands-on)

December 20 – December 31: Winter Break!!