

# *Design and Technology Academy (DATA)*

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## **3D Modeling and Animation**

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### **Course Syllabus 2020 – 2021**

#### **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.

As we start off the school year all classes will be online. I do not know for how long, but it is at least for the first 3 weeks we will be conducting class online. All students will need to participate in class via **Zoom, Microsoft Teams, and additional programs** I will introduce as we need them. NEISD is looking into providing some older laptops (not the Chromebooks) that can be used to remote into our computers on campus to use the class software. These older laptops cannot run these programs, but by remoteing into the computers on campus, the students will be able to run the programs as if they were in class. I have tested this method and it does work, but there may be delays depending on the internet connection. Remote in Computers on campus will be available during their designated class period and on a sign-up basis outside of school hours.

**IF or When** we return to in-person classes, students who will be taking classes on campus will be able to use the game design software in the computer lab. Students remaining online will still be able to use the NEISD provided laptops to participate in class through Zoom and Microsoft Teams and remote into on campus computers.

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.

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 of these 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.

## **Online Instruction:**

All students will participate daily in their classes. The school schedule may look a little different this year, but participation will be expected each school day for the designated classes on that day. There will be both synchronous and asynchronous learning.

**Asynchronous learning** is a general term used to describe forms of education, instruction, and learning that do not occur in the same place or at the same time. It uses resources that facilitate information sharing outside the constraints of time and place among a network of people.

**Synchronous learning** refers to a learning event in which a group of students are engaging in learning at the same time. Before learning technology allowed for synchronous learning environments, most online education took place through asynchronous learning methods.

The method we will use that will be the recommended and the best method for your student is the synchronous method. This method will occur at the same time using Zoom during designated class periods Monday - Friday. Asynchronous learning can be used but is not the preferred method. All the homework and class assignments will be available on Teams, but the student will miss out on live lectures and face-to-face time with the teacher and other students if they do not participate in the live sessions. Additionally, to get attendance credit, the student must check in before midnight on the day of instruction and complete the work required for that day. Additional guidance from NEISD on Synchronous and Asynchronous learning may be provided on the district website:

<https://www.neisd.net/Page/28880>

## **Core Learning Goals:**

1. The student will learn video game design concepts and apply them to their individual and group projects.
2. The student will learn to use Unreal Engine to make different types of video games.
3. The student will learn basic C++ for Unreal Engine programming for their games.
4. The student will learn how to design video game environments and how to animate characters and objects in their video games.
5. The more advanced video games will be done in small groups and will take more time. This will occur in the second semester.

## **Classroom Rules: Applies to both in-person and online**

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. 1<sup>st</sup> infraction: You will receive a verbal warning.
2. 2<sup>nd</sup> infraction: Conference with teacher. (via in-person or Zoom)
3. 3<sup>rd</sup> infraction: Conference with teacher and a phone call to Parent or Guardian. (via in-person or Zoom)

## **Classroom Procedures:**

1. Walk in and immediately take your seat. If we are working on projects, get started immediately. We only have 50 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 at school 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 in to 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](mailto:pfritz@neisd.net).

### **Tardy Procedure: In-person instruction only**

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: In-person instruction only**

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: Both in-person and online instruction**

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 or on Zoom when the bell rings or designated time.
2. Raise your hand when you want to speak in class. On Zoom unmute and wait for your turn to speak.
3. Absolutely no eating, drinking, or chewing gum in the classroom. Water bottles with a lid will be allowed. (In-person instruction only)

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 during in-person instruction, 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. Failure to follow this rule will require you to place your phone on my desk during each class period.
7. While in class during in-person instruction, 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. While in class during in-person instruction, 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. While in class during in-person instruction, the charging of 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. While in class during in-person instruction, 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.

The District 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. The District 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	15%
• Quizzes	20%
• Homework	15%
• <u>Notes</u>	<u>10%</u>
Total	100%

# 3D Modeling

## Lesson Calendar – 1<sup>st</sup> Semester

### Week 1: 17 – 21 August

Introductions – Online procedures, Zoom

Learning how to remote into our computers

Syllabus and class expectations

Teams – What it is and how we will use it

Maya – Learning the Interface and How Maya Works

### Week 2: 24 – 28 August

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

Rendering the Bug in Arnold

Introduction to Unreal Engine

Setting a scene in Unreal Engine

### Week 3: 31 August – 4 September

Rendering the Bug in Unreal Engine

Faces, Edges and Vertices

Combining and Separating Shapes in Maya

### Week 4: 7 – 11 September

7 September – Holiday (Labor Day)

Target Weld Vertices and Edges, Bridging, and Extruding

Edge Loops, Connect, and Multicut Tool

Bevel Tool



### **Week 5: 14 – 18 September**

Make a Simple House

Render the House in Unreal Engine

Make a building starting with a cube

UVs

### **Week 6: 21 – 25 September**

More UV

Finding Textures for Photoshop

Adding textures to the building Using Photoshop

Render your building in Unreal

### **Week 7: 28 September – 2 October**

Making a more detailed building in Maya

### **Week 8: 5 – 9 October**

Making a more detailed building in Maya

UV the building

### **Week 9: 13 – 16 October (end of 1<sup>st</sup> quarter)**

12 October – School Holiday

Knowledge test over 1<sup>st</sup> quarter learning

Hands on test demonstrating knowledge application

### **Week 10: 19 – 23 October**

Adding Color ID to you building in Maya

Introduction to Quixel

Exporting your building to Quixel Mixer

Finding Quixel Megascans for you building

**Week 11: 26 – 30 October**

Using Quixel to texture your building

Using Quixel Bridge to export your building to Unreal

Set up a scene in Unreal for your building

Render out your building

**Week 12: 2 – 6 November**

Make a spaceship – Find a picture of spaceship or draw a 3D one

Model your spaceship

**Week 13: 9 – 13 November**

13 November – Holiday (Veterans Day Observed)

Continue modeling your spaceship

UV your spaceship

**Week 14: 16 – 20 November**

Color ID your spaceship

Texture your spaceship using Quixel

**Week 14: 23 – 27 November**

Thanksgiving Holiday!

**Week 15: 30 November – 4 December**

Finish texturing your spaceship

Setup your scene in Unreal

Render your spaceship in Unreal

**Week 16: 7 – 11 December**

Setup cameras in Unreal for rendering

Animate the scene and render

**Week 17: 14 – 18 December**

Final Review

Finals

**December 21 - January 1<sup>st</sup>: Winter Break!!**