

Stanford University STEM Camp Detail

Ages 6-9

1-week course

Jr. Adventures in Minecraft Game Design

Design and Mod Minecraft Levels and Games

Using Minecraft, you'll dig deep into the world of game design in this hands-on course where campers learn what it's like to be a real game designer. Work in teams to create stories, levels, and games within Minecraft.

What Students Create:

- Minecraft mini-games
- Environments, terrain, and structures
- Rules, narrative, and mechanic



Jr. Adventures in Game Coding

Code Custom Games and Animations

Discover how to create video games and character animations while learning the basics of computer programming using Scratch Jr. Work collaboratively with classmates and instructors to create fun and engaging projects.

What Students Create:

- Interactive Story Apps (Sequence)
- Asteroid Evasion Game (Conditional Statements)
- Crossover and Geometry Dash Games (Loops)
- Dodgeball and Geometry Dash Games (Debugging)



Jr. Adventures in Acting & Filmmaking

Direct and Star In Your Own Short Film

Bring your story to life as you learn how to shoot and edit movies while expressing yourself through acting. Explore different filmmaking techniques, work with classmates as part of a production team, and develop an original story.

What Students Create:

- Silent Film, Super Hero Film, Fairy Tale Film, Fable Story



Jr. Adventures in LEGO Robotics

Engineer Your Very Own Motorized Robot

Use your imagination and have fun creating LEGO robots! Use programming to activate motors, lights, sounds, or displays and have your robot react to sounds, movement, as you create a custom robot.

What Students Create:

- Nine different robots, each one demonstrating a fundamental concept related to either simple machines or block-based programming



Stanford University STEM Camp Detail

Ages 9-12

1-week course

Adventures in 3D Printing & Modeling

Innovate and Create Custom 3D Models

Follow the same process as an industrial designer, putting an idea on paper, turning it into a 3D model, and bringing it to life using a 3D printer. Bring your ideas to life and learn the engineering design process.

What Students Create:

- Printed 3D models (including Dice & a Treasure Chest)
- A Final Project designed from the ground up that gets printed!
- A variety of 3D Models inside Tinker CAD



Made By Girls: Adventures in Wearable Tech & Fashion Design

Design and Program Unique Accessories

Explore where design and technology intersect. Learn the engineering design process using 3D modeling software to create your own virtual clothing. Discover how to use circuits, electronics, and Arduino while creating wearable devices.

What Students Create:

- Four e-textile projects
- Three Arduino Programs
- Several patterns for accessory design using Adobe Illustrator



Adventures in Minecraft Game Design

Design and Build a Minecraft Adventure Map

Take your problem-solving skills to the next level while learning to build and modify Minecraft worlds and adventure maps. Explore the different game design roles required to be a video game developer.

What Students Create:

- Resource packs with custom textures
- Maps and structures to support a game
- A game design document



Adventures in Roblox Game Development

Use Roblox Studio to Create Your Own Game

Dive into the endless world of Roblox and create your own games! Learn how to use Roblox Studio to create your own levels, environments, and worlds. Build upon those worlds by adding narrative and mechanics to create a fun experience for your players.

What Students Create:

- A single player platforming game
- A team-based group project game with custom mechanics



Stanford University STEM Camp Detail

Ages 9-12

1-week course

Adventures in Animation

Imagine and Create Your Own Movie

Discover how animators at Pixar, Cartoon Network, and Disney produce animated cartoons and movies. Create drawings and bring them to life using Toon Boom Harmony, the same software used by industry pros.

What Students Create

- Digital illustrations and simple drawings, Storyboards and project plans for their animation projects.
- 2D animated short films using keyframes and simple drawings.
- A stop-motion animated film using clay and props.



Adventures in Filmmaking

Bring Your Story to Life

Discover how Hollywood shoots and edits movies, while mastering filmmaking and special effects techniques. Express your creative voice through storytelling as you write a script, storyboards, and record your own movie.

What Students Create

- 2 short films
- Commercial or PSA with stock footage



Adventures in Artificial Intelligence (AI)

Discover Programming and Artificial Intelligence

Use AI tools like Machine Learning to create smart programs with characters that can play games, react to comments, or recognize your voice. Learn to code using Scratch while exploring the world of AI.

What Students Create:

- A functional chatbot
- Machine Learning models for text and image recognition
- Games and animations



Adventures in Game Coding

Discover Programming and Artificial Intelligence

Discover how to create animations, stories, and games while learning how to program using Scratch. Get a solid foundation in the basics of programming, learning how to use loops, conditionals, and variables to make interactive projects. Create your own artificial intelligence!

What Students Create:

- A functional chatbot
- Machine Learning models for text and image recognition
- Games and animations



Stanford University STEM Camp Detail

Ages 9-12

1-week course

Adventures in iOS App Development

Create, Code and Test Functional Apps

Explore fundamental programming concepts and use them to create a basic app for iOS. Create user interfaces, design apps, and test them with the help of classmates and instructor.

What Students Create:

- Several basic apps, A chatbot app, A whack-a-mole app, A social media app, A self-designed app



Adventures in Java Programming with Minecraft

Program and Create Custom Minecraft Mods

Learn how to build personalized Minecraft mods while gaining valuable Java programming skills. Learn how to design a fun game experience while working in a drag-and-drop coding environment.

What Students Create:

- Server-side, event-based mods for Minecraft
- A game or adventure with a narrative
- Balanced additions to an existing game



Makers Workshop

Invent and Program Electronic Gadgets

Bring gadgets to life with electrical engineering and Arduino. Ignite your creativity as you discover how engineering and programming work together to make new and exciting inventions. Use the design process to create, test, and improve your creations.

What Students Create:

- Fortune Teller, Grand Prix and Treasure Hunt video games, Bluetooth Rock-Paper Scissor Game
- Music Box, Electronic Musical Instrument, Maze-running and Line-following Robots



Adventures in LEGO Robotics & Programming

Build and Program Robots with LEGO EV3

Learn to design, build, and program awesome LEGO robots using the powerful MINDSTORMS EV3 robotics sets. You'll work to complete challenges using a variety of sensors and motors.

What Students Create:

- A portfolio of LEGO designs on LEGO Digital Designer and/or slideshow of projects, Programs using the EV3 software, At least one robot that can complete a given challenge, Different building and programming approaches based on trial-and-error



Stanford University STEM Camp Detail:

Ages 12-18

1-week course

3D Modeling with Maya

Model Your Own 3D Character

Create 3D models, sculpt characters, and build environments as you explore complex modeling techniques that focus on proper model topology. Learn professional workflows as your work with Autodesk Maya.

What Students Create:

- A wide variety of 3D Objects in Maya and Mudbox
- Simple models made of Polygon Primitives and advanced models using box modeling techniques
- Complex models such as a biped humanoid, etc.



Character Animation with Maya

Animate Your Own 3D Characters

Learn how to create 3D character animations with Maya. Bring characters to life by learning professional techniques to make animation fun and easy.

What Students Create:

- Several animations of a bouncing ball to display mastery of keyframes, weight, and timing
- Images of characters in expressive poses, displaying subtle control of the complex character rigs
- An animated shot using professional level character rigs
- A demo reel showcasing their work from this week



2D Animation & Digital Illustration

Draw and Illustrate Your Own Animations

Experience what a professional animation pipeline requires. Use Photoshop and Toon Boom Harmony to create a professional animation from start to finish.

What Students Create:

- Digital Drawings
- An Illustrated Pre-Production Packet
- Character Sheets and Turnarounds
- A Short Animation Showcasing Their Work



3D Printing & Product Design

Design and Print Your Own 3D Models

Discover the world of 3D printing and product design as you working with 3D modeling and CAD software to design your own projects before printing them out in 3D.

What Students Create:

- A wide variety of 3D Objects in Fusion 360
- Socketed and connecting parts for 3D Prints
- A custom Keychain, dice game, and USB Case
- 3D Files they can bring home with free software



Stanford University STEM Camp Detail:

Graphic Design

Build A Portfolio of Custom Digital Designs

Develop and improve your graphic design skills while mastering professional design tools, such as Adobe Photoshop and Adobe Illustrator. Create original projects for your professional portfolio.

What Students Create:

- Recreations of professional advertisements, Digital illustrations
- Original compositions that incorporate typography, color theory, and composition
- A portfolio that simulates real-world client work and incorporates personal style



Game Design with Unity

Design and Code Your Own Game

Use C# and the Unity Game Engine to design and code your own 2D and 3D games. Get introduced to basic game design concepts, including user experience design and beta testing.

What Students Create:

- Two guided projects: Flappy Bird and a space shooter
- One independent project
- Several Unity 3D environments and Scripts



VR & AR App Design with Unity & Oculus

Design and Code Your Own AR or VR Experience

Learn the skills you need to create virtual reality games and experiences for your mobile phone or VR headset. Create interactive experiences using AR while working with the Unity game engine.

What Students Create:

- Virtual Reality or Augmented Reality game or experience.



Electronic Music Production with Ableton

Produce Your Own Beats and EDM Tracks

Use Ableton Live to create hard-hitting EDM tracks. Learn electronic music production concepts, including composition, sound design, sampling, form, and style. Experiment with your music to create your own musical style.

What Students Create:

- A set of unique songs
- A Mashup



Stanford University STEM Camp Detail:

Audio Mixing & Mastering

Mix and Master Your Own Tracks

Learn how to edit and mix digital music. You'll take your own tracks from Ableton and explore industry standard plug-ins to mix and master your song into a polished composition to share on Soundcloud.

What Students Create:

- A Polished Final Mix of Their Track
- A Final Master
- A Rough Mix of Another Student's Song



Filmmaking

Create an Original Short Film

Explore the art of digital filmmaking as you shoot and edit your own unique videos. Learn to write a script, operate a camera, and make edits using professional video editing software.

What Students Create:

- Two to Three Short Film Projects
- Their very own YouTube Channel



Digital Photography & Photoshop

Compose and Shoot Stunning Digital Photos

Master your DSLR camera as you learn professional workflows and manual camera controls like aperture, shutter speed, and ISO speed settings. Use Adobe Lightroom and Adobe Photoshop to edit your photos before creating a professional portfolio.

What Students Create:

- Fun portraits, landscapes, closeup, and product shots
- The purpose and value of an artist statement
- A fast and efficient way to batch edit many photos at once, etc.



Intro to Java Programming

Design and Code Your Own App or Game

Learn Java programming fundamentals as you begin your computer science journey. Use concepts like variables and algorithms to code various projects and even prepare for the AP Computer Science exam.

What Students Create:

- Drawings and animations
- A game like Breakout
- A game story or animation of their choice



Ages 12-18

1-week course

AI & Machine Learning

Create Your Own Machine Learning Programs

Using systems like neural nets and special algorithms, you'll use machine learning to create software that can teach computers to do things like recognize faces and images, play games, or find complex patterns.

What Students Create:

- An implemented Neural Net for solving a challenge.



Arduino Robotics

Build Your Own Robot

Using a combination of mechanical, electrical, and software engineering, you'll learn how to design, assemble, and program using your own Arduino microcontroller. Design and build your robots to compete in challenges with your classmates.

What Students Create:

- A robot that performs autonomous tasks
- Unique code that they understand
- Designs for robot improvement and test courses



Electrical Engineering with Python

Build Your Own Internet-Connected Device

Discover the basics of circuitry and the Python programming language using Raspberry Pi. You'll create a variety of different projects that you can automate or control using the internet.

What Students Create:

- Projects that utilize the power of Python, Raspberry Pi, and the Internet
- Basic code that they will be able to modify themselves for future projects
- Lasting friendships



Ages 12-18

2-weeks course

3D Modeling & Animation Academy

Model and Animate a 3D Character

Learn how to create and sculpt 3D models and characters. In week 1, you'll master 3D Modeling with Maya. In week 2, you'll take Character Animation with Maya.

Week 1:

3D Modeling with Maya You'll learn valuable workflows that pros use and create and sculpt 3D models. We'll teach you the fundamentals of character design and rigging before you create your own original 3D props, set pieces, and characters.

Week 2:

Character Animation with Maya: Using Autodesk Maya, you'll learn how to bring characters to life, using lighting, settings, and camera angles. We'll teach you a workflow that will take pre-rigged models and animate them in an original short sequence that tells a story.

What Students Create:

- 3D Model and animation



VR & Game Design Academy

Design and Script Your Own Games

Learn how to use Unity and program with C# to create your own games. In week 1, you'll master Game Design with Unity. In week 2, take Game Programming for VR & AR to create fun experiences for your players.

Week 1:

Game Design with Unity: Create your own video games that can be explored on a PC, phone, or tablet! You'll learn the proper workflow to create custom environments, objects and player challenges using Unity. Learn the basics of coding in Unity using the C# programming language.

Week 2:

VR & AR App Design with Unity: Gain deeper knowledge of scripting, learning advanced programming techniques and editing tools. Focus on developing for virtual reality and it's unique design challenges, whether for a mobile device or the Oculus Rift.

What Students Create:

- 2D or 3D game



Ages 12-18

2-weeks course

Electronic Music Production Academy

Produce and Mix Your Own Beats

Explore professional music production while learning to use Ableton Live. In week 1, you'll master Electronic Music Production with Ableton. In week 2, take Audio Mixing & Mastering to turn your tracks into professional sounding compositions.

Week 1:

Electronic Music Production with Ableton: The course guides students in structuring a song, recreating sounds they hear, and building their own unique tracks. Topics covered include recording and audio sampling, advanced synth building, drum programming, improvisation, and an introduction to basic mixing and mastering.

Week 2:

Audio Mixing & Mastering: During the second week, students will work with a finished session of their choice (one of theirs, or from a small selection provided!) and explore the steps and tools used in Audio Mixing. Techniques such as Equalization, Panning, Time & Space Effects, and Automation will be applied.

What Students Create:

- Original remix, Mashup



Filmmaking Academy

Create a Film From Script to Screen

Go in-depth in the entire filmmaking process. In week 1, master Intro to Filmmaking. In week 2, you'll take Advanced Filmmaking as you learn advanced filmmaking techniques from pre-production to post.

Week 1:

Intro to Filmmaking: The course begins with basic principles of short narrative filmmaking: screenplay structure, camera functionality and operation, and role descriptions. Students learn how to work as a crew, how to storyboard, how to direct, and how to edit. Finally, students upload each of their projects to their own YouTube Channel.

Week 2:

Advanced Filmmaking: During the second week, students learn about title design and basic VFX with Adobe Photoshop and After Effects, before launching into their short film project. Film projects can be in a range of genres including narrative, music video, documentary etc.

What Students Create:

- Two to Three Short Film Projects
- Their very own YouTube Channel
- A short narrative project using a pre-written script
- Final project – student choice



Ages 12-18

2-weeks course

Robotics & Engineering Academy

Design, Build, and Program Your Creations

This course provides an introduction to the world of robotics and electrical engineering! We'll move students from basic programming and electronic circuit concepts to building the robot and exploring each sensor/actuator's capabilities by programming the RedBot Arduino platform.

The second week builds on knowledge of basic programming and circuitry to teach students to build their own unique projects using the Raspberry Pi and a variety of sensors. Students will learn the basics of Python, physical computing with the Pi, and how to use the Pi's internet connectivity to communicate with it remotely. Students will get to take their course materials home with them!

What Students Create:

- A robot that performs autonomous tasks
- Unique code that they understand
- Designs for robot improvement and test courses
- Projects that utilize the power of Python, Raspberry Pi, and the Internet
- Basic code that they will be able to modify themselves for future projects

