# Create with Code:

## Course Syllabus

In this official high school course from Unity, you will learn to Create with Code as you program your own exciting projects from scratch in C#. As you iterate with prototypes, tackle programming challenges, complete quizzes, and develop your own personal project, you will transform from an absolute beginner to a capable Unity developer. By the end of the course - if you want - you will be ready to put your skills to the test on the Unity Certified User Programming Exam. Most importantly, though, when you complete this course, you will have the confidence that you can Create with Code.

### Objectives

| | |
|---|---|
| **C# Skills:** | Students will gain a foundational knowledge of programming in C# and will feel confident that they can implement new features on their own with this knowledge |
| **Unity Skills:** | Students will have the confidence that, given enough time and resources, they could create anything they want in Unity |
| **Project Management:** | As students create their own personal projects, they will learn to manage the process from start to finish: outlining their concept, setting project milestones, and tracking progress. |
| **Unity Certified User Exam:** | Should they choose, students will have the skills and confidence to pass the Unity Certified User Programming exam, earning an official certificate validating their skills |

### Requirements

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|---|---|
| **Knowledge & Skills** | Students are not required to have any prior knowledge or skill with programming, C#, or Unity development |
| **Hardware & Software** | Students are required to have a computer capable of running Unity and a mouse with a scroll wheel (*note that an Apple "magic mouse" will not work) |

### Duration

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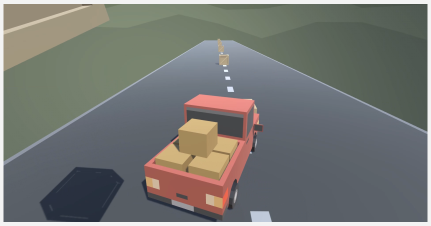
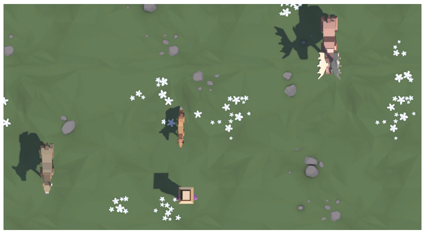
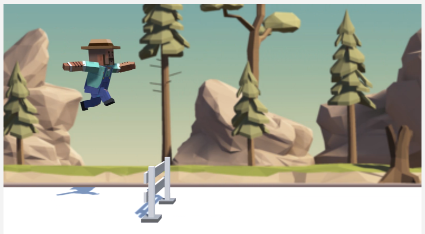
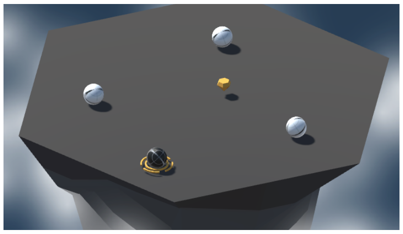
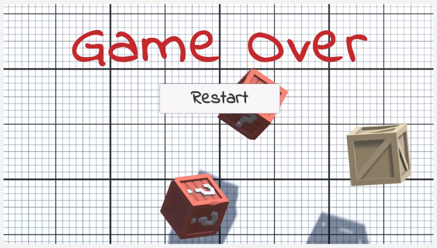
|---|---|
| **Independently** | If taking the course independently, the full course will take:<br>**40-50+ hours** |
| **In a Classroom** | If delivering the course to students in a classroom, the full course will take:<br>**50-100+ hours** |

## Course Structure

| Unit | Prototypes | | Assessments | Personal Project |
|---|---|---|---|---|
| 1 | **Driving Simulator**<br> | *Learn basic **player control** as you program a car that can steer down a floating road, avoiding (or hitting) obstacles in the way* | → **Challenge 1**<br>→ **Quiz 1**<br>→ **Bonus Features** | → **Lab 1** |
| 2 | **Feed the Animals**<br> | *Learn to implement **basic gameplay** with this top-down game where you throw food at animals, who are charging towards you.* | → **Challenge 2**<br>→ **Quiz 2**<br>→ **Bonus Features** | → **Lab 2** |
| 3 | **Run and Jump**<br> | *Learn to add **sound, animation, & effects** with this side-scrolling game where the player needs to time their jumps over oncoming obstacles.* | → **Challenge 3**<br>→ **Quiz 3**<br>→ **Bonus Features** | → **Lab 3** |
| 4 | **Sumo Battle**<br> | *Learn to program **gameplay mechanics** in a game where the player tries to knock off waves of enemies, using power-ups to help defeat them.* | → **Challenge 4**<br>→ **Quiz 4**<br>→ **Bonus Features** | → **Lab 4** |
| 5 | **Quick Click**<br><br> | *Learn to implement a **user interface** in a game where the player needs to click on objects tossed in the air before they fall off the screen.* | → **Challenge 5**<br>→ **Quiz 5**<br>→ **Bonus Features** | → **Lab 5** |
| | **Continued Lab work on Personal Projects** | | | |

# Grading and Rubrics

## Overview

- 40%: Prototypes | 5 x 8% each
- 15%: Challenges | 5 x 3% each
- 10%: Quizzes |  5 x 2% each
- 35%: Personal Project | 1 x 35% each

** Note that these weight values are only suggestions*

## Prototypes

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|---|---|
| **Weight** | 40%  (5 x 8% each) |
| **Description** | Students follow along step-by-step over the course of 4 lessons to create a prototype with the same functionality as the instructor, but with a few of their own creative choices. |
| **Purpose** | To teach students all of the concepts and skills they'll need to complete the challenges and quizzes, and to provide examples of core components that they could add to their personal projects |

| **4 - Excellent** | **3 - Good** | **2 - Fair** | **1 - Unsatisfactory** |
|---|---|---|---|
| - Project runs without error<br>- All functionality present and operating as expected<br>- Code and hierarchy are neat & commented, using correct conventions | - Project runs without error<br>- All functionality present and operating mostly as expected<br>- Code and hierarchy are mostly neat & commented, using correct conventions | - Project runs with some issues<br>- Some functionality missing, and overall not operating as expected<br>- Code and hierarchy are disorganized, using inconsistent conventions | - Project barely runs<br>- Most functionality absent<br>- Code and hierarchy are messy, with no sign of consistency in conventions |

## Challenges

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|---|---|
| **Weight** | 15%  (5 x 3% each) |
| **Description** | Students are provided with an incomplete or broken version of a project and tasked with 5 items to implement or resolve, including a couple of Bonus challenges. They are also provided with hints and an example of a completed challenge. |
| **Purpose** | To allow students to apply the skills they learned while creating the prototype to a new, but somewhat similar context, solidifying the concepts and extending their skills. |

| **4 - Excellent** | **3 - Good** | **2 - Fair** | **1 - Unsatisfactory** |
|---|---|---|---|
| - All 5 tasks have been completed fully | - 4 out of 5 of the tasks have been completed | - 3 out of 5 of the tasks have been completed | - 2 or less of the tasks have been completed |

## Quizzes

| | |
|---|---|
| **Weight** | 10%  (5 x 2% each) |
| **Description** | Students complete 10 multiple choice questions. |
| **Purpose** | To give students the opportunity to apply and check their knowledge in a decontextualized environment, which will also help prepare them for the Unity Certified User exam. |

| 4 - Excellent | 3 - Good | 2 - Fair | 1 - Unsatisfactory |
|---|---|---|---|
| - 9-10 out of 10 correct | - 7-8 out of 10 correct | - 5-6 out of 10 correct | - Less than 5 out of 10 correct |

## Personal Project

| | |
|---|---|
| **Weight** | 35%  (1 x 35% each) |
| **Description** | Students conceptualize, plan, and complete their own personal project throughout the course, integrating features they learned during the prototypes and extending them beyond. Students will be evaluated on ***completeness*** and ***uniqueness*** of their project. |
| **Purpose** | To give students an opportunity to *extend* their skills to a project that is uniquely their own, further solidifying the skills they learned and giving them the confidence that they can create whatever they want with the power of Unity and C#. |

| 4 - Excellent | 3 - Good | 2 - Fair | 1 - Unsatisfactory |
|---|---|---|---|
| - Project contains all of the features outlined in their project plan<br>- Stayed on track with their planned milestones<br>- Used their Unity and/or C# skills in a novel and creative ways<br>- Code and hierarchy are neat & commented, using correct conventions | - Project contains most of the features outlined in their project plan<br>- Stayed mostly on track with their planned milestones<br>- Used their Unity and/or C# skills in new, but not necessarily creative ways<br>- Code and hierarchy are mostly neat & commented, using correct conventions | - Project contains a few of the features outlined in their project plan<br>- Did not really stay on track with their planned milestones<br>- Did not use their Unity or C# skills in any new ways<br>- Code and hierarchy are disorganized, using inconsistent conventions | - Project does not contain any of the features outlined in their project plan<br>- Did not stick to their planned milestones at all<br>- Did not demonstrate an ability to apply skills they learned in the course<br>- Code and hierarchy are messy, with no sign of consistency in conventions |

# Create with VR

## Course Syllabus

### Objectives

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|---|---|
| **Virtual Reality Skills:** | Students will gain a foundational knowledge of building VR projects in Unity and will feel confident that they can implement new features on their own with this knowledge |
| **Unity Skills:** | Students will have the confidence that, given enough time and resources, they could create anything they want in Unity |
| **Project Management:** | As students create their own personal projects, they will learn to manage the process from start to finish: outlining their concept, setting project milestones, and tracking progress. |
| **Unity Certified User Exam:** | Should they choose, students will have the skills and confidence to pass the Unity Certified User: VR Developer exam, earning an official certificate validating their skills. |

### Requirements

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| **VR Knowledge:** | Students should have some previous basic experience using VR to get the most out of this content as a learner. If students haven't explored VR experiences before, try the basic tutorial content created for the available VR hardware.<br>Students do not need any experience developing for VR to use this learning content. |
| **Your VR hardware:** | This learning content is **fully supported** with the following headsets:<br>● Oculus Quest models<br>● Oculus Rift models |

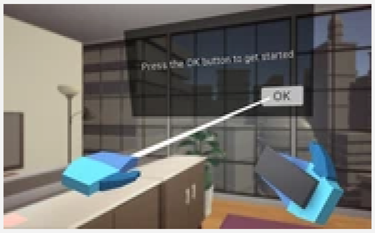
| | |
|---|---|
| | You can use any other headsets that support OpenXR, including the Valve Index and HTC Vive, but you are more likely to encounter obstacles along the way. Everything should function properly, but the learning content has not been fully tested and verified on these devices.<br>If you do not have access to a VR headset, you can still benefit from this learning content, but your ability to fully test the VR experience will be limited. |
| **Unity Skills:** | This course is for people with some experience using Unity Editor, but who are beginners to VR in Unity.<br>If you're completely new to Unity, start with the following learning experiences:<br>● Unity Essentials Pathway |

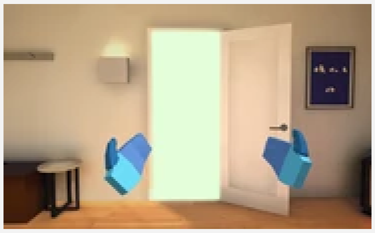
## Duration

| | |
|---|---|
| **Independently** | If taking the course independently, the full course will take:<br>**30-45 hours** |
| **In a Classroom** | If delivering the course to students in a classroom, the full course will take:<br>**45-60+ hours** (can be cut to 10, 20, or 30 hours to accommodate tighter schedules) |

| | | |
|---|---|---|
| **Unit 0** | **VR Software Setup** | 1 Hour 30 mins |
| **Unit 1** | **VR Basics** | 9 Hours15 Mins |
| **Unit 2** | **Events and Interactions** | 9 Hours15 Mins |
| **Unit 3** | **VR Optimization and lighting** | 9 Hours15 Mins |
| **Unit 4** | **VR Next Steps** | 45 mins |

## Course Structure

| Unit | Prototypes | | Assessments | Personal Project |
|---|---|---|---|---|
| 0 | **Tech Setup**<br> | *In this unit, you will set up your computer and your VR headset so that they are ready to begin VR development.* | | |
| 1 | **VR Basics**<br> | *In this unit, you will set up your computer and your VR headset so that they are ready to begin VR development.* | → **Challenge 1**<br>→ **Quiz 1** | → **Lab 1** |
| 2 | **Events and Interactions**<br> | *In this unit, you will implement more complex interactions in VR based to make the experience more immersive.* | → **Challenge 2**<br>→ **Quiz 2** | → **Lab 2** |
| 3 | **VR Ergonomics and Optimization**<br> | *In this unit, you will focus on ergonomics and optimization for VR in order to make your app as accessible and comfortable as possible.* | → **Challenge 3**<br>→ **Quiz 3** | → **Lab 3** |

| | | | |
|---|---|---|---|
| **4** | **VR Basics**<br> | *In this lesson, you will be provided with potential next steps, now that you have completed this course.* | |
| **Continued Lab work on Personal Projects** | | | |

# Grading and Rubrics

## Overview

- 24%: Challenges | 3 x 8% each
- 21%: Quizzes | 3 x 7% each
- 55%: Personal Project | 1 x 55% each

* *Note that these weight values are only suggestions*

## Challenges

| | |
|---|---|
| **Weight** | 24% (3 x 8% each) |
| **Description** | Students are provided with an incomplete or broken version of a project and tasked with items to implement or resolve, including several bonus challenges. They are also provided with hints and an example of a completed challenge. |
| **Purpose** | To allow students to apply the skills they learned while creating the prototype to a new, but somewhat similar context, solidifying the concepts and extending their skills. |

## Rubric Suggestion for challenges

### Technical Rubric

| 4 - Excellent | 3 - Good | 2 - Fair | 1 - Unsatisfactory |
|---|---|---|---|
| - The project runs without error.<br>- All functionality present and operating as expected.<br>- Hierarchy and folder structure is neat, using correct conventions.<br>- Unity skills were used in novel and creative ways.<br>- The project contains all of the features outlined in their project plan.<br>- Stayed on track with their planned milestones.<br>- All tasks from challenges were completed successfully.<br>- All bonus tasks from challenges were completed successfully. | - The project runs without error.<br>- All functionality present and operating mostly as expected.<br>- Hierarchy and folder structure is mostly neat and is using correct conventions.<br>- Unity skills were used in new, but not necessarily creative ways.<br>- Stayed mostly on track with their planned milestones.<br>- Most tasks from challenges were completed successfully.<br>- Bonus tasks were attempted. | - The project runs with some issues.<br>- Some functionality missing, and overall not operating as expected.<br>- Hierarchy and folder structure is disorganized, using inconsistent conventions.<br>- Unity skills were not used in any new ways<br>- Did not really stay on track with their planned milestones.<br>- Some tasks from challenges were completed successfully.<br>- No bonus tasks were attempted. | - The project barely runs.<br>- Most functionality absent.<br>- Hierarchy and folder structure is messy, with no sign of consistency in conventions.<br>- Did not demonstrate an ability to apply skills they learned in the course.<br>- Did not stick to their planned milestones.<br>- Few or no tasks from the challenges were completed.<br>- No bonus tasks were attempted. |

### Quizzes

| | |
|---|---|
| **Weight** | 21% (3 x 7% each) |
| **Description** | Students complete 10 multiple-choice questions. |
| **Purpose** | To give students the opportunity to apply and check their knowledge in a decontextualized<br>environment, which will also help prepare them for the Unity Certified User exam. |

| 4 - Excellent | 3 - Fair | 2 - Good | 1 - Unsatisfactory |
|---|---|---|---|
| - 9-10 out of 10 correct | - 7-8 out of 10 correct | - 5-6 out of 10 correct | - Less than 5 out of 10 Correct have been completed |

## Personal Project

| | |
|---|---|
| **Weight** | 55% (1 x 55% each) |
| **Description** | Students conceptualize, plan, and complete their own personal project throughout the course, integrating features they learned during the prototypes and extending them beyond. Students will be evaluated on completeness and uniqueness of their project. |
| **Purpose** | To give students an opportunity to extend their skills to a project that is uniquely their own, further solidifying the skills they learned and giving them the confidence that they can create whatever they want with the power of Unity and C#. |

# Rubric Suggestion for Personal Projects

## Technical Rubric

| 4 - Excellent | 3 - Fair | 2 - Good | 1 - Unsatisfactory |
|---|---|---|---|
| - Project contains all of the features outlined in the project plan.<br>- Stayed on track with planned milestones.<br>- Used Unity skills in a novel and creative ways<br>- All sections of the VR Project Design Doc were filled out in a professional and complete way.<br>- Project is set up and configured successfully.<br>- Project hierarchy and assets are well organized. | - Project contains most of the features outlined in the project plan.<br>- Stayed mostly on track with planned milestones.<br>- Used Unity skills in new, but not necessarily creative ways.<br>- Most sections of the VR Project Design Doc were filled out in a professional and complete way.<br>- Project is set up and configured with some errors.<br>- Project hierarchy and assets are organized. | - Project contains a few of the features outlined in the project plan.<br>- Did not really stay on track with planned milestones.<br>- Did not use Unity skills in any new ways.<br>- Project hierarchy and assets are organized but could be better.<br>- Grabbable objects are present but not always working.<br>- Locomotion is working and implemented in an erratic way.<br>- Audio and Haptics are implemented but not in any meaningful way. | - Project does not contain any of the features outlined in the project plan.<br>- Did not stick to planned milestones at all.<br>- Did not demonstrate an ability to apply skills learned in the course.<br>- Project hierarchy is not organized.<br>- Grabbable objects are not present or working.<br>- Locomotion is not implemented or not working.<br>- Haptics and Audio are not implemented. |

| | | | |
|---|---|---|---|
| - Grabbable objects are set up in a correct manner.<br>- Locomotion is set up and working in the project.<br>- Haptics and audio are implemented and working perfectly.<br>- Event-based interactions are implemented in a creative way and working as intended.<br>- User Interface is well designed and implemented.<br>- All primitive objects are replaced with 3D assets.<br>- Comfort and accessibility is thoroughly explored and implemented.<br>- Draw call and poly counts are fully optimised.<br>- App is built without errors. | - Grabbable objects are mostly set up in a correct manner.<br>- Locomotion is set up and working in most of the project.<br>- Some Haptics and Audio are implemented and working.<br>- Event-based interactions are implemented but not necessarily in a creative manner.<br>- User Interface is mostly well designed and implemented.<br>- Most primitive objects are replaced with 3D assets.<br>- Comfort and accessibility is explored and somewhat implemented.<br>- Draw call and poly counts are optimised but could be improved.<br>- App is built with some errors. | - Event-based interactions are implemented but not in any meaningful way.<br>- User Interface exists but is not well designed.<br>- Some primitive objects are replaced with 3D assets.<br>- Comfort and accessibility can be improved.<br>- Draw call and poly counts are considered but not well optimised<br>- App is built with numerous errors. | - Event based interactions are not present.<br>- User Interface is not implemented.<br>- No primitive objects are replaced with 3D assets.<br>- Comfort and accessibility is not considered.<br>- Draw call and poly counts are not considered at all.<br>- App cannot be built due to errors. |

## Mindset Rubric

| Growth | Mixed | Fixed |
|---|---|---|
| - Looked forward to the next challenge.<br>- Saw mistakes as temporary setbacks, something to be overcome.<br>- Reflected on learning and applied the takeaways.<br>- Invited feedback and criticism and applied it to improve the project.<br>- Used different strategies and asked others about their strategies. | - Took on challenges after having success in related challenges.<br>- Motivated by feedback when it wasn't too critical and if comfortable with the person providing feedback.<br>- Open to strategies that help to meet a challenge but tends to work on things they're already "good at."<br>- Persevered with prompting and support.<br>- Asked questions about things in Unity that they felt more confident with but less likely to | - Did not want to take on challenges alone.<br>- Saw mistakes and failures as proof the task was too difficult and not worth pursuing.<br>- Avoided feedback or saw it as a reason to give up.<br>- Did not demonstrate any effective strategies for accomplishing project tasks or goals.<br>- Showed little or no persistence through challenges.<br>- Did not ask questions or seek guidance and support. |

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|---|---|---|
| - Showed stamina while working on the project until it was complete.<br>- Asked specific questions, including questions about your own thinking, and challenged others' ideas.<br>- Showed confidence in taking risks and happily shared mistakes made and what was learned. | do so if it is outside their comfort zone.<br>- Took risks if the task was already fairly familiar. | - Did not take risks. |