

## **Block 2. Virtual Reality**

### **Module 1. Language**

#### **1.1 C#**

C++ is essential in neurotechnology for its high performance, efficiency, and ability to process complex neural computations in BCIs and neuroimaging. It enables real-time signal processing, machine learning, and hardware optimization, making it crucial for tasks like feature extraction and brain-computer communication. Many neuroscience tools, such as OpenBCI, ITK, and VTK, rely on C++ for their core functions. Learning C++ provides a strong foundation for developing high-performance applications and working with embedded systems in neurotech.

Task: Complete either of the following programs. Send a screenshot of your completion screen upon finishing the course. If you are proficient in C++, please send a screenshot of a recent project you have completed.

1. Complete the [Udacity](#) C++ Nanodegree program. This program covers modern C++ techniques, including memory management and real-time processing, which are crucial for neurotech applications like brain-computer interfaces (BCIs).
2. Complete the [MIT OpenCourseWare](#) course. This platform offers foundational C++ programming concepts used in computational neuroscience and neuroimaging, making it a solid starting point for neurotech applications.

### **Module 2. Development**

#### **2.1 Unity 3D User Interface**

Unity 3D's user interface (UI) is crucial in neurotechnology for visualizing BCI data, designing neurofeedback applications, and developing immersive VR/AR environments for cognitive and motor rehabilitation. It enables researchers to create real-time dashboards, BCI control interfaces, and interactive neurorehabilitation experiences. As a powerful tool for translating complex neural data into user-friendly interactions, Unity advances both research and practical applications in neurotech.

Task: To better understand how Unity 3D works, complete Udemy's "[Unity UI Development](#)" and Coursera's "[Game Design and Development with Unity UI](#)." Send a screenshot of your completion screens upon finishing the courses. If you are proficient with Unity 3D, please send a screenshot of a recent project you have completed.

Task: Read the following [UI Toolkit Documents](#). Answer the questions below to ensure reading comprehension.

Extra Resources:

- [Unity Beginner Tutorials YouTube Playlist](#)

- [Modern Unity UI with UI Toolkit](#)

1. Which of the following is NOT one of the UI systems available in Unity?

- A) UI Toolkit
- B) Unity UI (uGUI)
- C) ImGui
- D) Unreal UI**

2. What is a key advantage of UI Toolkit compared to Unity UI (uGUI) and ImGui?

- A) It is the oldest and most stable UI system
- B) It is based on standard web technologies for better cross-platform performance**
- C) It is exclusively designed for in-game debugging displays
- D) It replaces the need for any GameObjects in UI development

3. When should you use ImGui in a Unity project?

- A) For developing complex runtime UI for games
- B) For creating custom Inspectors and in-game debugging displays**
- C) As the primary UI system for all new Unity projects
- D) For creating mobile-friendly user interfaces

4. Which statement best describes the current status of UI Toolkit in Unity?

- A) It is the only UI system supported for new Unity projects
- B) It is still missing some features found in Unity UI (uGUI) and ImGui**
- C) It is exclusively used for developing UI within the Unity Editor
- D) It has completely replaced the need for Unity UI (uGUI) and ImGui

5. What is the main difference between UI Toolkit and Unity UI (uGUI)?

- A) UI Toolkit is a retained-mode UI system, while Unity UI (uGUI) is GameObject-based**
- B) Unity UI (uGUI) is designed for web development, while UI Toolkit is for game UI
- C) UI Toolkit relies on the OnGUI function, while Unity UI (uGUI) does not
- D) Unity UI (uGUI) is newer and optimized for performance across platforms

## 2.2 Unity 3D Basic Applications

Unity 3D is widely used for developing interactive applications, including games, simulations, and virtual environments. Its versatility extends to fields like education, healthcare, and neurotechnology, where it enables real-time data visualization, VR/AR experiences, and user-friendly interfaces. With its cross-platform capabilities and powerful development tools, Unity remains a leading choice for creating immersive and interactive applications

Task: Complete the [Unity Essentials Learning Pathway](#). Send a screenshot of your completion screen upon finishing the course. If you are proficient with Unity 3D, please submit a screenshot of a recent project you have completed.