Functional Requirements

1. Device Login
   Functional Requirements
   1.1. The device shall allow users to login with their given username and password.
   1.2. The credentials will be matched against the system database.
   1.3. If the credentials match the database, the login will be successful, and users will be taken to the home screen.
   1.4. If the credentials do not match, then users will be notified about the wrong credentials and will be given 3 chances for the login attempt.
   1.5. If a user attempts more than 3 times with wrong credentials the device will be locked for 10 minutes. A countdown timer will be shown to the user for next tries.
   1.6. If the user has 2 Factor Authentication enabled, then an OTP code will be sent to the user's email address or phone number (whichever is setup before).
   1.7. If an OTP code was sent, upon login the system will ask for the OTP code for successful login.

   Priority Level: High

   Precondition: The device must be registered with the system and users shall have valid credentials.

   Cross-references: N/A

2. Institutional Signup
   Functional Requirements
   2.1. The system shall provide a signup form for Institutions in the Admin control panel.
   2.2. Admin should fill up the sign-up form with appropriate information from the paperwork.
   2.3. Institutions should provide their unique EIIN number to signup.
   2.4. Institution should provide their required number of devices.
   2.5. The system shall generate a unique ID for each of the student's account and a one-time password which will be handed over to the students, which they have to change after their first login.
   2.6. Admin will handover the Institution account dashboard to the designated Teachers from the Institution upon a successful sign up.

   Priority Level: High

   Precondition: Institutions must provide their official documents including paperwork from Government issued documents.

   Cross-references: N/A

3. Student Signup
   Functional Requirements
   3.1. Teachers should collect the emails of their students to assign device accounts to them.

3.2. Teachers should also assign additional information such as their Name, Semester, Taken courses,

3.3. Teachers should set a timeframe for validity of the students account.

Priority Level: High

Precondition: Teachers should have access to institutional account all the student's email to sign up accounts for them.

Cross-references: N/A

4. Forgot Password
   Functional Requirements
   4.1. The system shall provide a "Forgot Password" option in the login interface.
   4.2. Users should be able to provide their unique ID to identify their account in order to create a new password.
   4.3. The system shall send a Password reset link to the user's email.
   4.4. The system should check if the account has 2 factor authentication enabled and ask for the OTP code in that case.
   4.5. The system should check that the new password does not match with any old password.

   Priority Level: High
   Precondition: The account must exist on the system.
   Cross-references: N/A

5. Guest User
   Functional Requirements
   5.1. The system should provide a limited access account for the Guest user.
   5.2. The Guest user account should be able to join AR Trips without logging in.
   5.3. The system should do a check for the account type before the Guest user joins the AR Trips and limits collaborative access.
   5.4. Access limitations for guest users shall be clearly communicated by the system through notification.

   Priority Level: High
   Precondition: The account must exist on the system.
   Cross-references: N/A

6. Time based learning modules
   Functional Requirements
   6.1. The teacher should provide learning modules related for current semester to the students.
   6.2. The system shall expire the modules based on semester timespan.
   6.3. The teacher should be able to revoke access for the learning modules at any time.

Priority level: High
Precondition: N/A
Cross reference: N/A

7. Assessment Preparation
   Functional Requirements
   7.1. The teachers should be able to create new assessments for the students.
   7.2. Assessment parameters such as time limits and grading criteria shall be customizable by teachers.
   7.3. The system shall provide analytics tools for analyzing assessment results and tracking student progress.
   7.4. The teachers should have access to previously set questions from the system.

   Priority level: High
   Precondition: N/A
   Cross reference: N/A

8. Live streaming for teachers
   Functional Requirements
   8.1 The system should provide a live class session for the students.
   8.2 After starting the live session the students would be able to join the session.
   8.3 Before joining the live session the teacher should give permission to each students.
   8.4 Live streams shall support real-time interaction with students, including chat and Q&A features.

   Priority level: High
   Precondition: The teacher must have a valid and active user account on the streaming platform.
   Cross reference: N/A

9. Assignment Distribution
   Functional Requirement
   9.1 Teachers shall have the ability to create and distribute assignments to individual students or groups.
   9.2 Assignment details such as instructions, due dates, and resources shall be provided within the system by the teacher.
   9.3 Students shall receive notifications and reminders about assigned tasks.

   Priority Level: High
   Precondition: N/A
   Cross-references: N/A

10. Detect visualizable equations on the fly
    Functional Requirement
    10.1 The system shall analyze text inputs to identify mathematical equations.
    10.2 After identifying the mathematical equations, the students will be provided options to visualize the equations.
    10.3 Upon choosing the option, the student would be able see the graphical representation of the mathematical equations.

    Priority Level: High
    Precondition: The system should be able to detect mathematical equations.
    Cross-references: N/A

11. AR Field Trips for every user
    Functional Requirements
    11.1 The system would allow the teacher to upload 3D videos covering various educational topics and destinations.
    11.2 After uploading the 3D videos, the system would allow access to any kind of user.
    11.3 In the user interface, the system shall offer a selection of AR field trips to the user.
    11.4 After selecting the options, the users would be able to join the AR field trip.

    Priority Level: High
    Precondition: The teacher shall upload 3D videos.
    Cross-references: N/A

12. Assignment Distribution
    Functional Requirement
    12.1 The system would allow the teacher to create and distribute assignments to individual students or groups.
    12.2 While creating, the teacher should fill in the assignment details such as instructions, due dates, and resources shall be provided within the system.
    12.3 After assigning the assignment, notifications would be sent to the students.
    12.4 The system would send reminders to students at least 3 days before submission.

    Priority Level: High
    Precondition: N/A
    Cross-references: N/A

13. Natural Language Interface
    Functional Requirement
    13.1. The user should be able to control the system using natural language instructions.
    13.2. The system should support real-time translation of voice input from one language to another, selectable from predefined lists of languages.

Priority Level: Low
Precondition: The system must incorporate a natural language interface with real-time translation capabilities.
Cross-references: N/A

14. Student Monitoring for Teachers
    Functional Requirement
    14.1 Teachers should be directed to a comprehensive dashboard after logging in.
    14.2 The dashboard must display metrics related to student engagement, including Login frequency, Assignment completion status.
    14.3 Based on the gathered metrics, teachers should have the capability to send notifications to students as needed.

    Priority Level: High
    Precondition: The system must incorporate a dashboard for the teacher.
    Cross-references: N/A

15. Holographic communication
    Functional Requirement

    15.1 The system should provide a communication method between teachers and students while using the AR device.
    15.2 The holographic communication method should show an avatar of both the parties communicating.
    15.3 The communication method should work in a directive way such that when a user looks in the direction of someone, they can initiate a conversation.

    Priority Level: High
    Precondition: The system must track the user's head movement to accurately point to other users in the holograph.
    Cross-references: N/A

16. Content Creation
    Functional Requirements

    16.1 The system should facilitate a hub for content creators to see available works for them.
    16.2 The teachers should be able to place requests for making new content to the content creators.
    16.3 The system should provide a space for content creators to upload their contents.

Priority Level: High
Precondition: Content creators should be logged in.
Cross-references: N/A

Non – Functional Requirements

Usability: The AR interface should be intuitive and easy to use, especially for users with varying levels of technical expertise.

Reliability: The system should be available and accessible to users whenever needed, with minimal downtime for maintenance or updates. The system should be resilient to failures, with mechanisms in place to recover gracefully from errors without data loss. AR content and educational data should be stored securely and accurately to prevent corruption or unauthorized access.

Efficiency: The system should use resources (such as CPU, memory, and bandwidth) efficiently to optimize performance and minimize operational costs.

Performance: The system should provide real-time or near real-time response when interacting with AR devices.