From Students…
…to Professionals

Project Plan
Teacher’s Virtual Toolbelt
The Capstone Experience

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Functional Specifications

• Explore HoloLens as a teaching tool
• Using holograms to better illustrate class concepts (classical mechanics)
• Lesson planning
• Quizzes
• Stream mixed reality view
Design Specifications

• Web Application
  ▪ Simple web forms
    o Lesson planning
    o Course registration
  ▪ Easy to navigate
    o Single page application
    o Live stream cohesive with student chat box
    o Quiz scores

• HoloLens Application
  ▪ Universally used 2D/3D holograms
    o Arrows, spheres, lines, circles
  ▪ Billboard style reference material
Screen Mockup: Web Forms

Teacher's Virtual Toolbelt

New Lesson

Title

Add Quiz
Add Text
Add Reference Material

Lesson Contents

<table>
<thead>
<tr>
<th>Type</th>
<th>Title</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz</td>
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<tr>
<td>Reference</td>
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</tr>
<tr>
<td>Quiz</td>
<td>Q2</td>
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</tbody>
</table>

Teacher's Virtual Toolbelt

Course Registration

Course Name: 
Instructor Name: 

Submit

Upon submission, your individual course code will be generated. Students may use this code to enroll in this course.
Screen Mockup: Live Lessons

CSE 101: Lesson 3

Chat Box
Submit your questions and feedback to the instructor.
Submit

This lesson is currently unavailable.
Return Home
Screen Mockup: Web Application

Welcome to the Teacher's Virtual Toolbelt!

Please login to view your courses.

Quiz Results
Lesson: Lesson 1
Date: 01/20/2017

<table>
<thead>
<tr>
<th>Question</th>
<th>Percent Correct</th>
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<tbody>
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<td>Q4</td>
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Screen Mockup: HoloLens

Gravity
Gravitational

Gravity, or gravitation, is a natural phenomenon by which all things with mass are brought toward (or gravitate toward) one another, including planets, stars and galaxies. Since energy and mass are equivalent, all forms of energy, including light, also cause gravitation and are under the influence of it.

https://en.wikipedia.org/wiki/Gravity
Technical Specifications

• HoloLens Application
  ▪ C#
  ▪ Unity, Visual Studio

• Single Page Web Application
  ▪ AngularJS, HTML, CSS, SQL, C#, ASP.NET Web API
  ▪ Visual Studio

• HoloLens Live Streaming
  ▪ Device API calls (GET .mp4), LowLatencyMRC script
  ▪ FFmpeg, Azure Media Services
System Architecture

- Windows Azure
- Application Server
- .NET Web Application
- Streaming Endpoint
- SQL Database Server
- SQL Database
- Live Streaming Media Service
- Hololens Application
- Microsoft Login Authentication
System Components

• Hardware Platforms
  ▪ Microsoft HoloLens
  ▪ Microsoft Azure

• Software Platforms / Technologies
  ▪ Single Page Web Application
  ▪ ASP.NET Web API
  ▪ Unity C# HoloLens Application
  ▪ Augmented Reality Live Streaming
Testing

• Using Git as version control and to track issues
• New features will..
  ▪ be created on new branches
  ▪ be merged to master branch upon team testing and approval
• Perform user testing at major project milestones
Risks

- **HoloLens Development**
  - No previous experience
  - HoloLens Academy and Unity tutorials
- **Mixed Reality Live Stream**
  - Key component with minimal documentation
  - Started immediately, considering alternatives (Live Services, OBS)
- **HoloLens and Web Service APIs**
  - What is best framework for communication between web application and HoloLens?
  - Research .NET Web API framework, HoloLens HTTP requests
- **Reference Material**
  - Rendering reference material from the web without an in-app browser
  - Research ways to render HTML pages in Unity, and how to store this data
Questions?