PREREQUISITES
Students should be familiar with 3d modelling software, either Rhinoceros or 3d Studio Max, and basic video editing software, such as Adobe Premiere.
Students have their own laptop with Unreal Engine 5 installed (link with instructions).
A PC laptop is highly recommended (they can use Mac, but with limitations).

SUBJECT DESCRIPTION
In the last few years, Real-time technology is transforming Architecture in radical ways, changing the way we design, communicate and review projects. In "Alternative Practises: Realtime" will learn how to use Unreal Engine, the software leading this change, and how to incorporate it into their practice in a way that does not replace traditional tools but instead augments them.

We will focus on two main applications:
- Realtime for design, were ideas and early concepts can be interrogated and help making better and quicker decisions early on in the project.
- Realtime for communication, were proposals can be easily materialized in full pre-rendered visualizations or interactive experiences that help explaining and selling an idea or project.
The students will be given a 3d model and, working in pairs or groups, they will design an exhibition to be showcased in that space. Therefore, the exhibition will have to be designed and iterated on (design stage) and then materialized as a high-end cinematic or interactive experience to be pitched to the rest of the class (communication stage).

That way, they will be exposed to all basic tools in a practical manner, while keeping the workload manageable. This will be treated as a real world assignment, with a scope and deadline comparable to a real-world project, so we will also discuss processes, handling complex projects, managing client expectations, etc, aiming for results that are comparable to current commercial standards.

By the end of this course, students should have a clear understanding of the true potential of this tool and will be able to produce stunning animations from start to finish in a fraction of the time that would take on more traditional CGI software. They will also be familiar with some advanced concepts, such as Interactivity, VR and Digital Twins, drafting a clear path for those who want to continue their Real-time journey beyond what we will learn in this course.

OBJECTIVES AND SKILLS

Alternative Practices: Realtime aims to equip students with the following competencies:

- Acquire knowledge of real-time technology to power design processes in a more efficient, cost-effective and engaging manner.
- Use real-time technology to present designs in a more appealing format, such as animations and interactive experiences, in a fraction of the time it would take with more traditional software.
- Familiarise with the rapid evolution and trends in this area, including VR and Digital Twins
- Understand the limitations and opportunities of real-time technology, and how to work around them
- Adopt good practices around time management, pitching and presentation skills, managing client expectations, etc
- Learn the basics of cinematic language, narrative techniques, composition principles, and how to apply them in Architecture.
- Additionally, Per the Decree EDU/2075/2010, 29 of July

Basic Competencies:

- CB1: Students have demonstrated knowledge and an understanding of a given area of study, building upon the foundation of secondary education, supported by advanced texts, and including aspects that engage the latest advances in their area of study.
- CB2: Students know how to apply their knowledge professionally to their work or vocation and possess the competencies that are often demonstrated through elaboration and defense of arguments and the resolution of problems within their area of study.
- CB3: Students can gather and interpret relevant facts (usually within their area of study) in order to make judgments that include reflection on relevant social, scientific, and ethical topics.
- CB4: Students can transmit information, ideas, problems, and solutions to both specialized and non-specialized audiences.
- CB5: Students have developed the necessary learning skills to continue their studies with a high degree of autonomy.

General Competencies:

- CG1: Knowledge of the history and theories of architecture, as well as that of the arts, technologies and human sciences related to the field.

Specific Competencies:
- CE48: Adequate knowledge of the general theories of form, composition, and architectural typologies.
- CE54: Adequate knowledge of aesthetics, and the history and theory of fine and applied arts.

Crossed Competencies:
- CT1: Ability to identify the main characteristics of cultural identities that characterize the contemporary world through the knowledge of central ideological currents.
- CT2: Ability to exercise professional behavior in accordance with constitutional principles and ethical values of the respective profession.
- CT3: Manage unforeseen situations with the capacity to respond to changes within organizations.
- CT4: Use disciplinary knowledge to analyze and evaluate current situations. CT5.
- CT5: Integrate oneself into interdisciplinary and multicultural teams to achieve common goals in a context of diversity.
- CT6: Work actively at in an international context.

METHODOLOGY
The course is planned as an assignment to pitch and showcase an exhibition in a building which 3d model will be provided at the beginning of the course. Using freely available assets, the students will mock up the exhibition, produce a draft animation and pitch it to the rest of the class. They will then continue refining the exhibition and animation using some more advanced techniques, and presented the results at the end of the course, as an animated cinematic visualisation or interactive experience.

This is a realistic timeframe for this type of delivery in a real commercial context, and we will treat it as such. Students will have to propose not just what the exhibition is going to be about, but also how it is presented and put in front of the client. They will learn how to prioritize and use what Realtime technology offers to get the best results possible, not just aiming for visual excellence but also efficiency.

Working in real-time involves a lot of different disciplines and techniques coming together. The classes will consists of series of short lectures, breaking down these techniques, and supported by excersises to be done in class right away. These will all have a direct transation to the final delivery, and by the end of week 2, students should have all the tools and skills needed to produce the final delivery. These sessions will alternate with group work ones in a workshop format, ahead of any group presentations, so students are encouraged to ask questions and solve any potential problems during those sessions.

While the bulk of the work will be done in class, it is encouraged for students to continue practicing and doing some homework, especially if they feel they need to catch up or revisit some of the basic concepts before things get too complicated.

<table>
<thead>
<tr>
<th>Teaching methodology</th>
<th>Weighting</th>
<th>Estimated time a student should dedicate to prepare for and participate in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>30.0 %</td>
<td>45 hours</td>
</tr>
<tr>
<td>Discussions</td>
<td>10.0 %</td>
<td>15 hours</td>
</tr>
<tr>
<td>Exercises</td>
<td>20.0 %</td>
<td>30 hours</td>
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<tr>
<td>Group work</td>
<td>40.0 %</td>
<td>60 hours</td>
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<tr>
<td>Other individual studying</td>
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<td>0 hours</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100.0 %</td>
<td>150 hours</td>
</tr>
</tbody>
</table>

24th June 2022
PROGRAM

SESSIONS 1 - 3 (LIVE IN-PERSON)
1. INTRODUCTION AND DISCUSSION AND COURSE ASSIGNMENT
   - Why did you choose this class and what do you expect to learn.
   - What is Realtime and what are the applications in Architecture.
   - What makes a good visualization/interactive experience.
   - What are other industries doing and what can we learn from them.
   - Limitations and opportunities.
   - Objectives and structure of the course.
2. INSTALLING UNREAL
   - Windows vs Mac.
   - Epic Games Launcher.
   - Engine Versions.
3. THE UNREAL EDITOR
   - Creating a new project.
   - Finding your way in the editor.
   - The content browser.
   - Worlds and levels.
   - Assets vs Actors.
   - Saving our work.
   - Collaboration (migrating assets).

SESSIONS 4 - 6 (LIVE IN-PERSON)
4. IMPORTING MODELS
   - Exporting from Rhino or 3d Max.
   - Datasmith vs FBX.
   - Layering models.
   - Reimporting.
5. BASIC MATERIALS
   - The material editor.
   - PBR materials.
   - Material instances.
   - Using Bridge.
6. GROUP WORK
   - Choosing an exhibition theme.
   - Start bringing in the 3d model into Unreal.

SESSIONS 7 - 9 (LIVE IN-PERSON)
7. USING THE MARKETPLACE
   - Sourcing free high-quality Assets from the Marketplace.

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- Adding vegetation and objects to the project.
- Migrating assets from other projects.

8 + 9. GROUP WORK
- Preparing the exhibition.

SESSIONS 10 - 12 (LIVE IN-PERSON)

10. ANIMATING CAMERAS
- Level sequencer.
- Rule of thirds, hero shots, 180 rule.
- Using curves.
- Working with shots.
- Working to a soundtrack.
- Depth of field.

11. EXPORTING
- Exporting from the sequencer.
- Render queue.
- Basic video editing/encoding.

11. GROUP WORK
Working on cameras and preparing the first draft presentation.

SESSIONS 13 - 15 (LIVE IN-PERSON)

13. ADVANCED DRAFT PRESENTATIONS AND DISCUSSION
Students to present their first draft (rough cut) of their animations + exhibition proposal.

14. BASIC LIGHTS AND GRADING
- Static, dynamic, movable.
- Light parameters.
- Time of Day and Sky.
- Volumetric fog.
- Post-processing Volumes.

15. GROUP WORK
- Begin lighting the scenes.
- Work on feedback from the first draft presentation.

SESSIONS 16 - 18 (LIVE IN-PERSON)

16. TEXTURES
- Using textures in materials
- Sourcing good quality textures
- Understanding UVs
- Unwrapping models

17 + 18. GROUP WORK

SESSIONS 19 - 21 (LIVE IN-PERSON)
19. ADVANCED MATERIALS
- Decal materials.
- Material parameters collections.
- Adding parameters collection variables to the animation.
- Understanding how to use numbers in materials.
- Using World Position for clipping.

20 + 21. GROUP WORK
- Prep time for advanced draft.
- Potentially water and caustics.

SECTIONS 22 - 24 (LIVE IN-PERSON)

22. ADVANCED DRAFT PRESENTATIONS AND DISCUSSION
23. INTRO TO INTERACTION AND BLUEPRINTS
24. GROUP WORK
Students to present their second draft (advanced cut) of their animations.
- Setting up a simple Game Mode.
- Level Blueprint: basic events and variables.
- Driving the sun position through Blueprints.
In-class working time.

Other / Complementary Documentation: Blueprints Extra Learning Material (Unreal Engine) (Will be Provided by Professor)

SECTIONS 25 - 27 (LIVE IN-PERSON)

SESSIONS 25, 26 & 27 (LIVE IN-PERSON)
25. ADVANCED REAL-TIME CASE STUDIES
26 + 27. GROUP WORK
- Digital twins.
- VR.
- UE5 and Raytracing.

SECTIONS 28 - 30 (LIVE IN-PERSON)

SESSIONS 28, 29 & 30 (LIVE IN-PERSON)
28 + 29 + 30. FINAL PRESENTATIONS AND DISCUSSION

EVALUATION CRITERIA

Students must attend at least 70% of all class sessions.
Evaluation will be mostly based on the final group presentation, taking into account both the results and the process to get there (the early drafts are as important as the final presentation) as well as the pitch itself for each member of the group.
The rest of the mark will account for the engagement in class and the working sessions (both individual, after the lectures, and as a group, during the workshops).
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Percentage</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workgroups</td>
<td>30 %</td>
<td>Process and results for the group</td>
</tr>
<tr>
<td>Group Presentation</td>
<td>20 %</td>
<td>Individual contribution to final pitch</td>
</tr>
<tr>
<td>Individual Work</td>
<td>25 %</td>
<td>Assignments and work during the class</td>
</tr>
<tr>
<td>Class Participation</td>
<td>25 %</td>
<td>Involvement during the lessons and discussions</td>
</tr>
</tbody>
</table>

**PROFESSOR BIO**

Professor: **ANGEL FLORES SANCHEZ**  
E-mail: afloress@faculty.ie.edu

Angel Flores studied Architecture at Universidad Politécnica de Valencia in Spain, as well as spending one year at Hokkaido University in Japan, where he had the chance to work with Shigeru Ban.

After graduating, he specialised in using Real-time Engines for creating visualizations both Architecture and Media Entertainment, including its use in Virtual Reality experiences, interactive apps and visualization.

Currently, Angel works as a Principal Programmer for the game company Tanglewood Games in the UK, and teaches at the IE in Madrid and the AA in London.

**OTHER INFORMATION**