**Phases**

* Discovery
  + Research the domain
  + Research the users
  + Why are we designing this?
  + Weeks 1-6
    - Project templates
    - Background research: domain, users
    - Aims, evaluation criteria
    - Project proposal
      * Peer review
      * Tutors
    - Literature review
* Design
  + Create a concept for the project
  + Weeks 6-11
    - Architecture
    - User interface/experience
    - Algorithms
    - Work plan
    - Evaluation plan: unit testing, final evaluation criteria
    - First prototypes
* Development
  + Create software
  + Weeks 11-23
    - Programming
    - Testing
    - Iteration
    - Technical writeup
* Delivery/deployment
  + Hand over to user / submit for marking
  + Weeks 20-25
    - Final prototype
    - Final report
    - Final evaluation
    - Video demonstration

Throughout: *testing*. Not just before, or even during development

Assessment:

* Proposal
  + Pass/fail, no weighting
* Preliminary report
  + End of design phase
  + 10%
* Progress logs
  + End-of-topic checklists
  + 5%
* Draft report
  + Formative
  + No weighting
* Video presentation
  + 5%
* Final report
  + 60%
* Exam
  + About own project
  + Ensure project is your own
  + 20%

# Physics based Game

**What problem is this project solving?**Create a 3D game that uses physics as a key element of gameplay.

**What is the background and context to the question above?**  
Physics simulation is one of the most powerful ways of creating compelling gameplay that feels real, going back to classic games like Half-life and angry birds. Physics based games are fun, dynamic and unpredictable and allow for very rich interaction. This project should draw on both the 3D Graphics and Animation and the Game Development modules to create a short but compelling game List some recommended sources for students to begin their research

* Surgeon Simulator (<https://www.surgeonclassic.com/>)
* Human Fall Flat (<https://www.nobrakesgames.com/humanfallflat>)
* Garry’s Mod (<https://store.steampowered.com/app/4000/Garrys_Mod/>)
* Free Physics games on itch.io (<https://itch.io/games/free/tag-physics/tag-sandbox>)
* Katamari Damacy Reroll (<https://en.bandainamcoent.eu/katamari/katamari-damacy-reroll>)

**What would the final product look like? (e.g. presentation, usability, functionality, results)?**The final product will be a fully functional video game that uses physics to create a fun, easy to play experience. The gameplay should be a maximum of 5 minutes. Shorter and more polished is preferable and will receive higher marks than longer and not as well executed. It will have the following game design characteristics:

* Easy to pick up and play
* Uses physics simulation as a key element of gameplay
* Instantly fun and gratifying
* May optionally use other elements of the 3D Graphics and Animation course, such as keyframe animation and shaders, to enhance the effect.
* 3rd party assets may be used for graphics, animation and audio, but you must have permission and credit them appropriately

**What would a prototype look like?**Prototype needs to show a core physics-based gameplay loop which is challenging, engaging, simple to pick up but which shows strong promise for emergent complexity. It needs to prove you know what the core of your game is, what the player is meant to be doing and how they are going to do it. Most mechanics and broad aspects of level design should be clear at prototype stage. Graphics and sound are not important at this stage. Prototype is perfectly fine using boxes and other primitive objects.

**What kinds of techniques/processes are relevant to this project?**

* Iterative development
* Frequent playtesting
* Unity/C#
* 3D scene design
* Unity Physics Engine

**What would the output of these techniques/processes look like?**

* A series of incrementally improving prototypes – showing how you have tested and incorporated feedback from play testers.
* Some aspects of the game have been dropped from the first iterations, some have been added, some have been modified, in line with AGILE development practices.
* Several sets of feedback from players that inform your ongoing development and design process.

**How will this project be evaluated and assessed by the student?**Student will use play testers and solicit feedback on the developing game. Main source of data will be player opinions and, where possible, player actions where it’s possible to directly observe playtesting.

**For this brief, what would a minimum pass (e.g. 3rd) student project look like?**

* Game can be loaded, started and finished without major bugs/crashes.
* The game makes use of Unity’s physics engine
* Poor audio-visual presentation.
* Gameplay is confusing and/or boring.
* Written report lacks research, detail of process, issues encountered in production, and/or doesn’t name influences or audio-visual assets used appropriately.

**For this brief, what would a good (e.g. 2:2 – 2:1) student project look like?**

* Game functions well without bugs.
* The gameplay makes good use of physics to create a fun and dynamic experience
* Good audio-visual presentation, possibly using keyframe animation and/or shaders
* Gameplay is quickly understandable, it’s easy to start playing.
* Written report makes clear the challenges faced and how they were overcome. Makes clear the influences that went into the game (e.g. games played and analysed, which mechanics were inspired from where etc.).
* Audio-visual assets appropriately credited.
* Playtesting feedback is clearly gathered and acted on

**For this brief, what would an outstanding (e.g. 1st) student project look like?**

* Game is highly-polished technically, and in terms of audio-visual presentation.
* Game uses innovative and original physics-based mechanics (or well-known mechanics in a novel manner)
* Possibly also using advanced animation and shader techniques
* Game requires no instructions – it’s very clear what the objective is and how to achieve it from the opening screen.
* Game is easy to start playing, but repeated play shows a well-selected set of simple mechanics that lead to depth and emergent complexity as the player replays the game over several sessions.
* Written report has excellent and concise writing style. Research and influences behind the project are clear and detailed, with extensive analysis of background works.
* Playtesting has been frequent/ongoing, extensive feedback has been gathered and documented and it’s very clear how this has been incorporated into the iterative development of the game.
* It is evident there have been several version/iterations of the game, and the challenges at each point have been documented and analysed.

# Topic 1

Choose template  
Background research  
Concept pitch peer review - 3min video

* Does video display knowledge of area of study and previous work?
* Does video critically evaluate previous work?
  + Find the gap that nobody’s done
  + Find a technique that works well to be incorporated
  + Find a technique that doesn’t work well, to be avoided
* Is project concept justified based on domain, users?

Per these three criteria, 5 evaluation levels:

* Not done
* Not achieved, buuuut…
* Yes attempted, buuut…
* Yes
* Yes, and furthermore…

# Topic 2

Discovery phase.

Focus on aims, objectives, project proposal.

Testing during discovery: does background research support project idea?

Ethics considerations.

End of topic, submit proposal for tutor approval.

3-5 minute video

* Template name
* Idea for the project
* Motivation
* 2-4 related project examples