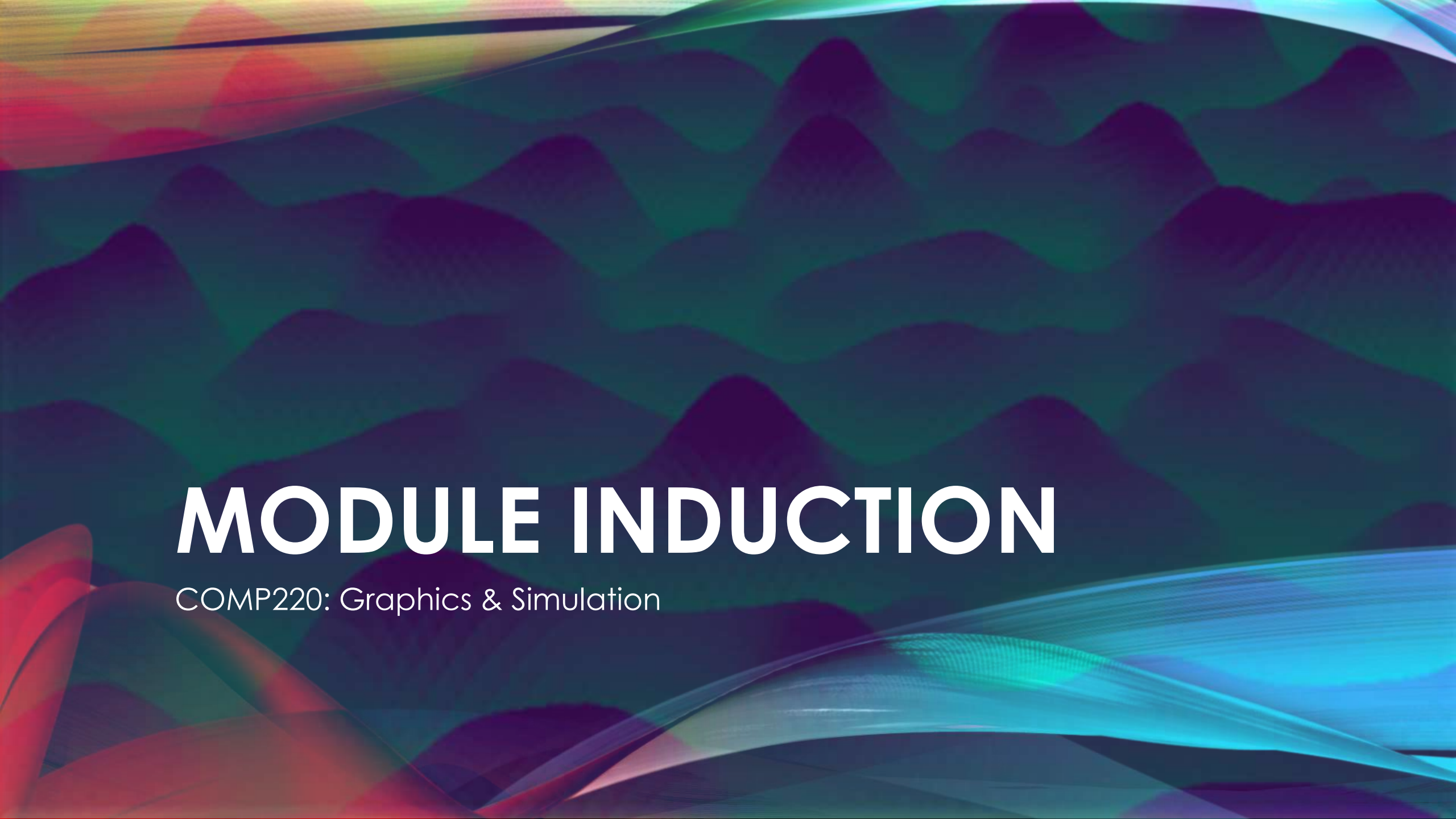
MODULE INDUCTION
COMP220: Graphics & Simulation

SESSION AIM

- **Anticipate** the content of the module (topics and structure).
- **Understand** the module aim and learning objectives.
- **Plan** your time management strategies for completing the assignments.

MODULE AIM

To **research** and **apply** creative computing to the domain of computer graphics and simulations.

On this module, you will develop your understanding of computing in more depth through a greater focus on game engines. You develop your coding skills in the context of graphics technologies and pipelines and gain an understanding of the operation of simulated virtual environments. You will engage practically and creatively to **repurpose** physics processing and graphics rendering pipelines in order to change their behaviours and create distinctive visual styles suited to a specific concept.

LEARNING OUTCOMES

ID	NAME	DESCRIPTION	ASSESSMENT CRITERIA CATEGORY
2	Architect	Integrate appropriate data structures and interoperating components into software, with reference to their merits and flaws.	ANALYSIS
5	Research	Develop an argument on a topic using appropriate research methods, primary and secondary sources, and academic conventions.	RESEARCH

WEEKLY OVERVIEW

Week 1	Week 2	Week 3	Week 4	Week 5
Overview • Recap of the graphics pipeline • Topics in computer graphics	**Introducing OpenGL** • Setting up the OpenGL framework • Drawing a basic primitive • Shaders/GLSL	**Meshes and Transforms** • Properties of 3D geometry meshes • Transforms and the projection matrix	*Worksheet development*	**Materials and Lighting** • Applying textures • Using vectors to apply a variety of lighting effects

* No workshop

Week 6	Week 7	Week 8	Week 9 *	Week 10	Week 11
Studio practice/ mid-term review	**Post-processing** • The frame buffer and its uses • Creating effects in GLSL	**Simulating Physics** • Rigid body dynamics using the Bullet Physics Engine	**Profiling and Optimisation for Graphics** • The Bullet visual debugger • Common bottlenecks in computer graphics	**Rigging and Animation** • Construction and animation of articulated figures • Constraints and limits	***VIVA***

TEACHING METHODS

- Lecture (asynchronous)
- Workshop (synchronous)
- Supervisions (synchronous)
- Portfolio development (sync/async)

TEACHING METHODS

- Lecture (asynchronous)
  - A variable combination of:
    - Short pre-recorded videos introducing the topic(s) and/or demonstrating implementations
    - Reading material from textbooks or online sources
    - External videos or other material
  - Spend approx. 1h per week familiarising yourself with the content before attending the timetabled sessions!
- Workshop (synchronous)
- Supervisions (synchronous)
- Portfolio development (sync/async)

TEACHING METHODS

- Lecture (asynchronous)
- Workshop (synchronous)
  - 2-hour online synchronous activity as a timetabled Teams Meeting.
    - Recorded content will be posted on LearningSpace afterwards.
  - Focus on practical methods for implementing techniques relevant to the week's topics.
  - Opportunity for support/Q&A on any of the lecture material or with the worksheets.
- Supervisions (synchronous)
- Portfolio development (sync/async)

TEACHING METHODS

- Lecture (asynchronous)
- Workshop (synchronous)
- Supervisions (synchronous)
  - Weeks 2 (proposal review), 5, 8.
  - 1-hour Teams Meeting in small groups with your tutor.
  - To review and discuss your artefact plans and progress.
- Portfolio development (sync/async)

TEACHING METHODS

- Lecture (asynchronous)
- Workshop (synchronous)
- Supervisions (synchronous)
- Portfolio development (sync/async)
  - To support your work for Assignment 2 – technical report
  - 1-hour synchronous activity as a timetabled Teams Meeting.
  - 1 hour of asynchronous independent work to present before the next session.

ASSIGNMENTS

- Assignment 1: Artefact Worksheets [70%]
  - **Four** worksheets (roughly one every two weeks)
    - Worksheets 1-2: build the framework that forms the foundations for your artefact
    - Worksheets 3-4: plan, implement and refine your chosen graphics/simulation techniques
- Assignment 2: Technical Report [30%]
  - Produce a poster to report the outcome of practice-based research related to the technical architecture of your artefact
- See LearningSpace for assignment briefs, worksheets and formative deadlines
  - Submit pull request to Bitbucket before the deadlines for formative feedback
- See MyFalmouth for summative deadline

WORKSHEET SCHEDULE

Week 1	Week 2	Week 3	Week 4	Week 5
Overview	Introducing OpenGL	Meshes and Transforms	*Worksheet development*	Materials and Lighting

Proposal	Worksheet 1: framework	Worksheet 2: basic scene

Week 6	Week 7	Week 8	Week 9 *	Week 10	Week 11
Studio practice/ mid-term review	Post-processing	Simulating Physics	Profiling and Optimisation for Graphics	Rigging and Animation	*VIVA*

Worksheet 3: plan/prototype	Worksheet 4: implementation	Refinement

Posters

NOW WHAT…

- Take a look at the content for Week 1 on LearningSpace for an introduction to some of the topics relevant to computer graphics and simulation.
- Watch the Assignment Overview videos (in the Assessment section on LearningSpace) to learn more about the artefact you'll be creating for your assignment.
- Start to think about which techniques you'd like to implement, and prepare your **proposal** to present in **Week 2**.