COMPUTER GRAPHICS

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

Undergraduate Courses

Students take a balance of design and technical courses. The combination was requested by employers, and is unique in the region. It gives students mastery of existing animation and game techniques as well as the ability to create new types of software and experiences.

MDDN 211 - Digital Video Creation

This course will provide experience with conceiving, shooting, editing, and remixing video-based projects. Topics to be covered will include video editing techniques, video cameras and elementary lighting, digitizing, codecs, colorspaces, compositing, filtering, and other effects topics.

MDDN 241 - 3D Modeling and Animation

Introduction to fundamental topics in 3D modelling and animation, including industry standard software, the process and theories relating to the genre, and experimenting with hybrid techniques relating to other design approaches. This course provides a basis for 300-level courses in postproduction and game design.

MDDN 242 - Computer Graphics Production

Topics include parameterized design, generative modelling, and essential elements of creative 2D and 3D coding, with a focus on working with simple algorithms in generating visuals, as well as compositing different media, such as 3D and video. Project briefs are inspired by real world phenomena.

MDDN 243 - Introduction to Computer Game Design

A production and theory course, focussing on understanding the wider significance of computer gaming, and the game prototyping techniques of smaller scale "indie" or independent game development. Students explore the industry-based practice of combining game design, game programming and game art production when building their own game in groups.

MDDN 311 - Postproduction and Special Effects

Digital media products such as film special effects and games often require the creation of novel visual experiences while working within large professional graphics software packages. In this course students will gain experience stretching the boundaries of these packages, including the use of programmed extension and generative approaches.

MDDN 343 - Advanced Computer Game Design

Advanced techniques in computer game design and examination of the emerging areas of computer gaming and professional practice. The course focuses on a production-based approach where students build their own computer games using 3D tools for modelling, interactive animation and experiences that are immersive.

COMP 308 - Introduction to Computer Graphics

Introduction to graphics programming. Content includes graphics APIs, the graphics processing pipeline (geometry processing, viewing, projection, transformation, illumination, texture mapping), display hardware, graphics cards, image formats, and colour theory. Course projects use OpenGL, the standard graphics API for IOS and Android games.

Postgraduate Courses

The graduate programme is supported by industry partners Weta Digital (visual effects for The Hobbit, Avatar), Pikpok (New Zealand's largest game developer) and Fingertapps (advanced interface technologies) via scholarships, internships, and guest lecturers from these companies. Research projects are largely focussed on the game and movie industries but also prepare students for careers in media art and applied scientific visualisation.

COMP 471 - Algorithms and Maths for Games and Graphics

This course introduces the mathematics needed for computer graphics using visual examples. The course assumes limited programming skill but no mathematics. Thanks to the visual and experimental approach of the course, students are able to work with advance topics motivated by recent research by the end of the course.

COMP 472 - Project in Computer Graphics Programming

Participants in this course collaborate to develop complex graphics projects, such as a 3D world involving terrain, realistic atmosphere, and moving waves. In previous years the course has had mentors from Weta Digital.

COMP 408 - Computer Graphics Rendering

This is a course on the programming and mathematical foundations of advance rendering. Topics include ray tracing, advanced lighting techniques, texture mapping and its derivatives, radiosity, photon mapping, and advanced shading and lighting techniques on modern graphics cards.

COMP 409 - Three-Dimensional Modelling for Computer Graphics

This course introduces the algorithmic and mathematical foundations of three-dimensional modelling. Topics include representations such as polygons, splines, implicit surfaces, point models, particle systems, and volumetric models, concepts such as parameterisation, curvature, and discrete differential geometry, and algorithmic approaches such as gradient domain processing, spectral processing, and example-based deformation.

MDDN 441 - Computer Graphics for Film

This course covers computer graphics techniques that are used as current practice in the film industry. While working on projects that span a range of approaches for generating special effects, and algorithmic treatment of media, students will also review and analyse cinematic examples.

MDDN 442 - Computer Graphics for Interaction Design

This course examines computer graphics techniques that are current practice in interactive computer graphics. While working on projects that span a range of approaches for generating special effects, and algorithmic treatment of media, students will also review and analyse examples from interactive firms.

Practicum

Graduate students are considered for a practicum (internship) at Weta Digital, the visual effects facility known for its work on Avatar and the Lord of the Rings series. Internships in previous years have involved topics in rendering, fluid simulation, and machine learning, and have resulted in research jointly published with Weta.