CG: Computer Graphics

CG 111 — Survey of Computer Graphics
1 credit; 1 lecture hour
Students are exposed to a broad array of software environments and concepts that they may encounter in real-world collaborative environments as well as higher-level courses. This course is suggested as a companion to first-level computer-based studio courses.

CG 121 — Applications of Social Media
2 credits; 1 lecture and 2 lab hours
Students explore the tools and applications of social media and the implications of their use. Best practices and supporting research are also addressed, as well as the dynamics of group collaboration, experienced through class projects and online collaboration tools.

CG 211 — Computer-Assisted Design
2 credits; 1 lecture and 2 lab hours
Paint- and image-processing software (Photoshop) is used as an artist's tool to solve basic design problems and create original, innovative work. Emphasis is on exploring the visual elements inherent in good design.

CG 212 — Introduction to 3D Computer Modeling
2 credits; 1 lecture and 2 lab hours
The theory and concepts needed to understand and construct 3D models are introduced. Focus is on acquiring the techniques used to create 3D models and how to apply real-world effects to their work through material application and lighting. Software: 3ds Max.
Prerequisite(s): CG 211 or PH 272 or IL 125 or CD 251 or MG 253.

CG 213 — 2D Computer Animation
2 credits; 1 lecture and 2 lab hours
Focus is on 2D animation, design, compositing, and production issues using Adobe Photoshop and After Effects applications.
Prerequisite(s): CG 211 or IL 125 or PH 272 or CD 251.

CG 214 — Web Page Construction
1.5 credits; 1 lecture and 1 lab hour
Students learn to construct and implement web pages, from content creation through production. Current HTML and contemporary graphical web designing software are discussed, demonstrated, and used to create deliverable web pages. Basic image editing skills are recommended before registering for the course.

CG 221 — Design and Authoring for Interactive Media I
2 credits; 1 lecture and 2 lab hours
Introduction to designing for interactive media using current scripting languages to produce finished projects, including websites, games, and animation for various delivery media including mobile devices. Importing various kinds of graphics, video, animation, special effects, and sound is explored. Basic image editing skills are recommended before registering for the course.

CG 224 — Programming for Artists
2 credits; 1 lecture and 2 lab hours
Computer programming for designers and artists using open-source programming language. Students, with no prior experience, learn to write their own programs using graphics and interactions to master basic programming concepts. Examples will be shared that highlight the increasing interaction between programming and real-world art and design projects.

CG 225 — Introduction to Game Design
2 credits; 1 lecture and 2 lab hours
In this introduction to game design, students are guided through a step by step process of creating 2D/3D games using a gaming engine. They learn about plot and character development, graphics and materials, level design, visual programming and developing playful experiences.

CG 251 — Digital Editing for Film and Video
2 credits; 1 lecture and 2 lab hours
The concepts involved in editing video and animation are explored with an emphasis on telling a story through the editing process. Students learn how to assemble audio and video elements and gain studio experience in managing media assets, nested timelines, and basic workflow procedures. Use stock footage or provide own camera.

CG 271 — Design Fundamentals for Animation and Game Design
2 credits; 1 lecture and 2 lab hours
In this design fundamental course, students will learn basic design principles including but not limited to line structures, additive color, 3D space, pattern creation, as well as using the computer graphics as the medium to create imagery/artwork for animations and games.

CG 272 — Narrative Animation Fundamentals
2 credits; 1 lecture and 2 lab hours
This introductory 2D animation course introduces the principles and techniques of narrative animation to artists and designers of various disciplines. Students will learn to bring their characters to life using fundamental animation skills and techniques. The focus is on combining digital animation tools with traditional animation principles and styles.

CG 273 — 3D Fundamentals: Modeling, Rendering, Motion, and 3D Printing
2 credits; 1 lecture and 2 lab hours
The theory and concepts needed to understand and construct 3D models are introduced. The focus of this introductory course is on acquiring the techniques used to create 3D models and how to apply real-world effects to their work through material application and lighting. Fundamental efficiency and familiarity with design software are strongly recommended for students registering for this course.

CG 274 — Web-based Game Development Fundamentals
2 credits; 1 lecture and 2 lab hours
This course introduces new creative possibilities in the field of interactive media development. It is geared towards students with a strong visual creative background and serves as a bridge to learning how to use code with image elements. This is an essential course for using web-based scripting languages to exercise interactive game development and problem-solving skills.

CG 299 — Independent Study in Computer Graphics
1-3 credit
Prerequisite(s): a minimum 3.5 GPA and approval of instructor, chairperson, and dean for Art and Design.

CG 311 — 2D Computer Image Generation
2 credits; 1 lecture and 2 lab hours
This advanced image-processing course builds on concepts introduced in previous courses. Sophisticated tools are explored and applied in individual projects. Software: Adobe Photoshop.
Prerequisite(s): CG 211 or IL 125 or PH 272 or approval of instructor.

CG 312 — 3D Computer Modeling and Rendering
2 credits; 1 lecture and 2 lab hours
This course focuses on building 3D models for use in 3D animation. Students explore standard and advanced construction and rendering techniques as they complete assignments and creative projects.
Software: 3ds Max.
Prerequisite(s): CG 212.

CG 314 — Programming Concepts
2 credits; 1 lecture and 2 lab hours
Languages used in computer graphics and interactive design, are presented, with emphasis on current scripting languages. JavaScript (or other current language) is used to present concepts such as variables, objects, properties, data flow, and control.

CG 321 — Design and Authoring for Interactive Media II

2 credits; 1 lecture and 2 lab hours

Advanced Concepts for Interaction Design are explored using current, open source game engines. Planning and Scripting are emphasized, as well as a consideration of overall graphic, sound and human interface design to produce Interactive projects, environments and games.
Prerequisite(s): CG 221
Corequisite(s): CG 341.

CG 322 — Interface Design

2 credits; 1 lecture and 2 lab hours

This in-depth study of the field of interaction design and the concepts of interface design focuses on principles that are central to creating usable applications and effective, intuitive and consistent user experiences.
Prerequisite(s): CG 321.

CG 341 — 3D Modeling and Animation

2 credits; 1 lecture and 2 lab hours

Focusing on the creative process involved in constructing and animating 3D models, students explore the fundamental techniques for lighting and composing models and adding shaders to produce a specific mood, feeling, or expression.
Prerequisite(s): CG 212 or approval of chairperson
Co-requisite(s): CG 346.

CG 342 — Advanced 3D Computer Modeling

2 credits; 1 lecture and 2 lab hours

Students focus on techniques for planning and executing complex models, particularly animation-ready biomorphic characters. Analysis of the numerous variables that affect how successfully a model will perform in production provides a solid foundation for students to begin building 3D characters and preparing them for 3D animation.
Prerequisite(s): CG 341.

CG 344 — History of Animation

3 credits; 3 lecture hours

Students examine the work of pioneering contributions to the moving image on film that led to the invention of film animation techniques. The history of traditional animation and visual effects puts modern computer animation techniques in a larger historical context. Early inventions and innovations by magicians and artists prior to the 20th century are studied.

CG 345 — 3D Computer Animation

2 credits; 1 lecture and 2 lab hours

The fundamental building blocks of 3D animation are examined, and the traditional animation principles as they apply to computer animation are studied. Students learn to analyze motion and the devices of anticipation, reaction, overlapping motion, and squash-and-stretch to add clarity and strength to sequences.
Prerequisite(s): CG 341, CG 346, and CG 351.

CG 346 — Principles of Animation I

2 credits; 3 lab hours

Through a series of short projects using 2D animation software and a digitizing tablet, students learn how to apply the classical Disney principles of animation to their work. All phases of animation production are covered, with ongoing discussion and analysis of the work in progress. Students critique, refine, and improve the resulting animations.
Prerequisite(s): CG 212
Co-requisite(s): CG 351 and IL 302.

CG 351 — Storyboarding and Storytelling

2 credits; 1 lecture and 2 lab hours

Students create stories for animation by taking the first step: organizing their images in a sequence to create a storyboard. They learn the importance of the storyboard and script in planning a character animation and focus on the conceptual development of an expressive animated short.
Prerequisite(s): CG 213 or approval of chairperson
Co-requisite(s): CG 346 or approval of chairperson.

CG 352 — Music and Sound Design
2 credits; 1 lecture and 2 lab hours
Students learn to generate, manipulate, edit, and integrate sound into animation, video, and interactive projects using appropriate hardware and software. They plan and complete projects that incorporate sound as an integral part of the process.
Prerequisite(s): CG 321
Co-requisite(s): CG 345.

CG 353 — Motion Graphics
2 credits; 1 lecture and 2 lab hours
This course provides a range of experiences with 2D motion graphics as it applies to the commercial and post-production industries as well as topics important to 3D compositing and Effects work. Adobe After Effects is the primary software used, though other Adobe Creative Suite programs may also be utilized.
Prerequisite(s): CG 321 and CG 341
Co-requisite(s): CG 345 and CG 352.

CG 421 — Interactive Project Design
3 credits; 2 lecture and 2 lab hours
This course covers state-of-the-art visual concepts for interactive projects and game design using various media and delivery systems. Good user interface design and top-down design are emphasized through group projects.
Prerequisite(s): CG 322.

CG 422 — Interactive Production
2.5 credits; 5 lab hours
In a simulated real-world production environment, students design and produce an interactive project or game for various delivery media. Constraints such as budget, schedule, choice of tools, revisions, scaling down, and tracking the process of development are considered.
Prerequisite(s): CG 421.

CG 441 — Advanced 3D Animation
2 credits; 1 lecture and 2 lab hours
A full investigation of the potential of the keyframer and related 3D animation issues is covered. Techniques related to subtle animation control and animation rendering, including compositing, inverse kinematics, advanced morphing, special effects, and an in-depth analysis of lighting and camera, are discussed. Students plan and execute related projects.
Prerequisite(s): CG 342 and CG 345
Co-requisite(s): CG 451.

CG 442 — Animation Production
2 credits; 1 lecture and 2 lab hours
The methodologies and problem-solving techniques used by the 3D animator in a production environment are presented. Storyboarding, task assignments, and fully modular project designs are completed. Topics include advanced storyboard synchronization, detailed camera cut/movement planning, detailed lighting effects, multi-layered processing, and incorporation of imagery/animated maps generated by external software and rotoscoping.
Prerequisite(s): CG 441 and CG 451.

CG 446 — Principles of Animation II
2 credits; 1 lecture and 2 lab hours
Using a fully rigged 3D character, students study advanced topics in animation, focusing on an in-depth analysis of motion. Through the use of function curves, spacing, and keyframe techniques, they refine their thesis work-in-progress.
Prerequisite(s): CG 346
Co-requisite(s): CG 441 and CG 491.

CG 451 — Computer-Assisted Post-Production
2 credits; 1 lecture and 2 lab hours
Video and animation projects are brought to completion through an understanding of the postproduction process. Studio experience focuses on hands-on skills using non-linear editing and compositing software. Students gain insight into the film editor's role in the postproduction process and learn how to lay out projects for successful posting.
Prerequisite(s): CG 345
Co-requisite(s): CG 441.

CG 452 — Music Production for Interactive and Animation Thesis Projects I

2 credits; 1 lecture and 2 lab hours

Students produce an audio track that encompasses the mechanics of sound and sound design for their own interactive or animation thesis projects. Through sound production, they gain insight into the components needed to construct a sound track that provides depth and excitement to the visual product.
Prerequisite(s): CG 352
Co-requisite(s): CG 441 and CG 491.

CG 453 — Music Production for Interactive and Animation Thesis Projects II

2 credits; 4 lab hours

Building upon previously designed audio tracks, students progress from theoretical discussion to a practical application of the power of the audio track to their individual work. Through a hands-on approach, they design and apply an accurate sound layer to a thesis project.
Prerequisite(s): CG 452.
Co-requisite(s): CG 422, CG 442, and CG 492.

CG 491 — Senior Project Planning

2 credits; 4 lab hours

The senior project is planned and formal storyboard and written proposal are executed. Students work with the faculty member to develop concept and storyboard for short animation or interactive media project to be completed in the final semester.
Co-requisite(s): CG 421 and CG 441.

CG 492 — Senior Project

3 credits; 2 lecture and 2 lab hours

The aspects of creating and researching a thesis project are emphasized from the written proposal and storyboard to the thesis itself, including a short individual animation or interactive project. Projects are discussed and critiqued throughout the various developmental stages.
Prerequisite(s): CG 491.

CG 499 — Independent Study in Computer Graphics

1-3 credit

Prerequisite(s): a minimum 3.5 GPA and approval of instructor, chairperson, and dean for Art and Design.