

# VISUAL EFFECTS (VFX)

## VFX 101 Survey of Visual Effects (5 Credits)

Recognizing the pivotal role of visual effects and animation in modern media, this course explores their history and development through lectures, readings, screenings of important work, and hands-on projects. Students examine the various ways in which artistic and technological tools have been used to create convincing visual effects and animations for film, television, and games. With this background, students will then be exposed to modern techniques and positions within the VFX industry.

**Prerequisite(s):** DIGI 130.

## VFX 210 Introduction to 3D Computer Graphics (5 Credits)

This course introduces the essential concepts and hands-on techniques of the 3D CGI pipeline, from modeling and texturing to lighting, animation, and rendering. Students will gain valuable practical experience with industry-standard software while exploring the foundational principles that drive high-quality visual effects and computer-generated imagery in films, animation and interactive media. Through a series of progressive projects, students will develop a strong technical and artistic understanding of professional 3D workflows.

**Prerequisite(s):** VFX 101; VSFX 101; ARVR 110; SEQA 224 or ANIM 190.

**Attributes:** Studio Elective Requirement

## VFX 220 Compositing (5 Credits)

Compositing plays a crucial role in creating the final 3D image, combining multiple picture elements into a seamless, unified composition. Using a variety of digital techniques, including tracking, layering, color-correction and image manipulation, students produce dynamic compositions and environments. Using professional tools and software, students become fluent in the technical and artistic techniques used in the industry.

**Prerequisite(s):** VSFX 101 or VFX 101.

**Attributes:** Studio Elective Requirement

## VFX 230 Visual Effects-based Cinematography (5 Credits)

A strong cinematic knowledge is essential in all aspects of cinematic storytelling, both live and animated. Students delve into cinematic techniques used to elevate films and shows, such as shot definition, perspective, and framing. Focusing on camera use, lighting and color, students apply dramatic visual effects to enhance on-screen sequences. Students produce short film shots with a strong focus on the technical intricacies of cinematography.

**Prerequisite(s):** VFX 220 or VSFX 270.

**Attributes:** Studio Elective Requirement

## VFX 260 Introduction to Scripting for Visual Effects (5 Credits)

In this course, students develop coding skills essential for the visual effects artist. Students write purpose-driven code that produces specific effects and develops practical production tools. By learning Python and Linux, students build a strong foundation in fundamental programming concepts while developing essential problem-solving skills. This ensures students are well-prepared for the technical demands of professional visual effects work.

**Prerequisite(s):** (VFX 210; VSFX 210 or ANIM 249) or ANIM 190 or (GAME 236 or ITGM 236).

**Attributes:** Studio Elective Requirement

## VFX 289 Fundamentals of Rigging (5 Credits)

Building from the skeleton to the skin, rigs bring animated characters to life through articulated movement. In this course, students explore the principles of modeling and rigging through the use of industry-standard tools to create believable character motion. Major emphasis is placed on proper identification of controls.

**Prerequisite(s):** ANIM 249; VFX 210 or VSFX 210.

**Attributes:** Studio Elective Requirement

## VFX 306 Scripting for Animators (5 Credits)

Students experienced in digital animation and character setup learn how to streamline workflow using industry-standard scripting methods to automate character model building, animate actions, and rig characters.

**Prerequisite(s):** VSFX 160 or VFX 260.

**Attributes:** Studio Elective Requirement

## VFX 310 Matte Painting (5 Credits)

Digital matte painting explores the techniques of 2D image creation for use as backgrounds and set extensions. Students are introduced to the digital tool set and techniques for matte painting, as well as the history of the art. Projects and skills may complement courses dealing with related fields such as live action, 3D and compositing.

**Attributes:** Studio Elective Requirement

## VFX 311 Digital Materials and Textures (5 Credits)

This course explores advanced concepts in materials and texturing as applied to the 3D character model. The course explores material and texture application based on age, size, mobility and species, as determined by character environment, health and social characteristics. The course integrates information gleaned from reference materials into the 3D world.

**Prerequisite(s):** VSFX 210; VFX 210; ITGM 236; GAME 236; ITGM 240; ANIM 249 or ANIM 250.

**Attributes:** Studio Elective Requirement

## VFX 313 Advanced Application Scripting (5 Credits)

This course explores the use of MEL, Autodesk Maya's embedded scripting language, Python and other modes of shell scripting as tools for automating repetitive tasks, customizing the user experience, utilizing external data sources and extending the basic toolset with custom features.

**Prerequisite(s):** VSFX 210; VFX 210; ITGM 236; GAME 236; ITGM 240; ANIM 249 or ANIM 250.

**Attributes:** Studio Elective Requirement

## VFX 315 Facial Setup and Animation (5 Credits)

Animated characters get much of their character from their faces. Design, style, texture and expressive articulation all contribute toward more memorable animated storytelling. In this course, students explore all aspects of facial design, modeling, texturing, rigging and animation.

**Prerequisite(s):** ANIM 289; VFX 289 or ANIM 280.

**Attributes:** Studio Elective Requirement

## VFX 316 Digital Lighting and Rendering (5 Credits)

Cinematic lighting can transform and enhance the emotional impact of animated scenes. In this course, students explore 3D lighting design and rendering methodologies, developing models and solutions for various scenes. Through the study of cinematography and lighting theory, students learn to create mood, atmosphere, and focal points that meet character and narrative needs. Students become familiar with lighting tools and shading techniques, enabling them to emulate believable lighting situations in the production of short animated and live-action films.

**Prerequisite(s):** VFX 210; VSFX 210; ANIM 249; GAME 236 or ITGM 236.

**Attributes:** Studio Elective Requirement

**VFX 319 Programming Models and Shaders I (5 Credits)**

This course covers intermediate concepts in programming, with an emphasis on understanding the foundations of 3D modeling, lighting and shading, and the use of C/C++ and Pixar's RenderMan scene description languages. Students also learn Pixar's shading language for rendering special effects.

**Prerequisite(s):** VSFX 210; VFX 210; ITGM 236; GAME 236; ITGM 240; ANIM 249 or ANIM 250.

**Attributes:** Studio Elective Requirement

**VFX 326 Motion Capture Technology (5 Credits)**

Students utilize motion capture hardware/software to collect data from a live actor and evaluate, edit and export the data to a 3D digital character. The course emphasizes motion capture technology from the point of view of a technical director through managing, analyzing, importing and applying data as a structured process.

**Prerequisite(s):** VSFX 210; VFX 210; ANIM 249; ANIM 250; ITGM 258; GAME 258 or MOME 401.

**Attributes:** Studio Elective Requirement

**VFX 346 Non-human Character Setup (5 Credits)**

The anatomical challenges of finding rigging solutions for the unique characteristics of non-human motion are explored in this course. Use of scripting languages to expedite workflow is also explored. Emphasis is placed on the problem-solving responsibilities of a creature technical director, to include integration of muscle, cloth and fur into the rig.

**Prerequisite(s):** (ANIM 346; ANIM 289; ANIM 280 or VFX 289).

**VFX 349 Digital Modeling for Environments and Props (5 Credits)**

From haunted castles to futuristic temples, 3-D environment and prop modelers create complex and believable models that match the art direction of an animated movie. Students explore advanced topics in 3-D environment and prop modeling, with an emphasis on hard-surface modeling techniques and stylization that supports storytelling.

**Prerequisite(s):** VFX 210; VSFX 210 or ANIM 249.

**Attributes:** Studio Elective Requirement

**VFX 350 Procedural Modeling and Animation Techniques (5 Credits)**

Procedural modeling and animation techniques allow for the creation of environments with limitless complexity. They form the basis of techniques to create everything from expansive cityscapes to forests and volcanoes. Scenes are defined by relationships rather than singularities. Students are expected to utilize programming and text editing skills to develop dynamic digital effects.

**Prerequisite(s):** VFX 210; VSFX 210; ANIM 249; GAME 236 or TECH 236.

**Attributes:** Studio Elective Requirement

**VFX 356 Advanced Character Setup (5 Credits)**

This course explores the basic principles of creating an animatable skeleton for a 3D puppet, as applied to a series of anatomically different biped and quadruped characters. Students are assigned a prebuilt model to rig, explore advanced tools and apply them to various anatomical problems to find modeling and rigging solutions for believable character motion, and finally test the rigs with basic motion assignments.

**Prerequisite(s):** (ANIM 289; VFX 289 or ANIM 280).

**VFX 359 Organic Surfaces (5 Credits)**

From hideous, giant trolls to adorable, little kittens, 3D character modelers create complex and believable animated surfaces. Students develop 3D character design and organic surface modeling skills, with an emphasis on anatomy as it applies to predetermined movement requirements.

**Prerequisite(s):** ANIM 349; ANIM 351; VFX 350 or VSFX 350.

**Attributes:** Studio Elective Requirement

**VFX 369 Animation Look Development (5 Credits)**

A visual development artist is an essential part of an animated movie's creative team, designing and developing the look of a film. In this course, students use a variety of character-driven approaches to create illustrative-quality look development and bring an original aesthetic to their animation.

**Prerequisite(s):** (ANIM 349; VFX 349 or ANIM 351) and (ANIM 359; VFX 359 or ANIM 321).

**VFX 375 Advanced Programming for Visual Effects (5 Credits)**

In this course, students learn programming techniques and skills using C++. They explore and apply computer science concepts, control structures, data structures, use of program-development environments, program logic, problem-solving and object-oriented programming methodologies as it is practiced in the professional field of visual effects.

**Prerequisite(s):** VSFX 160; VFX 260; ITGM 220; GAME 220 or ITGM 303.

**Attributes:** Studio Elective Requirement

**VFX 380 Real-time Lighting for Visual Effects (5 Credits)**

The application of 3D lighting techniques allows industry professionals to create stories in real time. In this course, students become familiar with real-time production and emulate believable lighting solutions "based in reality." Students explore the theory of lighting and visual storytelling with an emphasis on composition, color, and art direction. Students apply concept designs to environments using real-time 3D applications to establish mood.

**Prerequisite(s):** ITGM 236; GAME 236; VSFX 316; VFX 280 or TECH 316.

**Attributes:** Studio Elective Requirement

**VFX 395 Collaborative Experiences in Visual Effects (5 Credits)**

Collaboration is key in visual effects, where teamwork and creativity come together to produce stunning results. Working in collaborative teams, students create a structured production pipeline, maintain effective communication, and propose creative solutions to technical problems, all while meeting project deadlines. Students produce an appealing and finished short project while experiencing the professional workflow of a collaborative project.

**Prerequisite(s):** (VFX 316; VSFX 316 or ANIM 379) and (VFX 350 or VSFX 350).

**Attributes:** Studio Elective Requirement

**VFX 401 Visual Effects Supervision (5 Credits)**

This course teaches efficient and creative use of visual effects for narrative film and television, through projects emphasizing technical problem-solving and creative planning and execution. Specific emphasis is given to on-set supervision and collaboration with directors and producers, camera, art and editorial departments. Students gain awareness of the capabilities of both digital and traditional techniques (practical effects, models and miniatures, prosthetics and animatronics, etc.).

**Prerequisite(s):** VSFX 210; VFX 210; FILM 240 or FILM 210.

**Attributes:** Studio Elective Requirement

**VFX 408 Concept and Preproduction for Visual Effects (5 Credits)**

Narrative storytelling is crucial in creating impactful visual effects. In this course, students study and apply principles of film language, screen design, and concept development to create compelling visual effects projects. Combining technical skills and research, students produce visual concept materials, develop well-timed animatics, and compile comprehensive preproduction packages that communicate a specific visual style.

**Prerequisite(s):** (VSFX 160 and VSFX 210) or ANIM 395; VFX 395 or SANM 560.

**Attributes:** Studio Elective Requirement

**VFX 409 Professional Development for Visual Effects (5 Credits)**

In this course, students develop the skills necessary for successful careers in the visual effects industry. By exploring current industry practices, students develop a strategic self-promotion plan and create professional-quality demo reels, résumés, and websites. The course emphasizes the creation of a cohesive and compelling portfolio that showcases technical and artistic capabilities, preparing students for their professional journey.

**Prerequisite(s):** ANIM 395; VFX 395 or SANM 560.

**Attributes:** Studio Elective Requirement

**VFX 411 Look Development for Digital Creatures (5 Credits)**

Exploring the challenges of integrating photorealistic creatures for film, television and games, students establish the look and style of 3D creatures through the definition of surface attributes. Students refine their skills and abilities for shading and texturing to create a final rendered look for a digital creature.

**Prerequisite(s):** (VSFX 311; VFX 311 or TECH 311) and (VSFX 316; VFX 280 or TECH 316).

**Attributes:** Studio Elective Requirement

**VFX 420 Technical Direction for Compositing (5 Credits)**

This course provides the foundation for students to produce complex composite images used in the animation, broadcast design, interactive, game and visual effects industries and equips students with the technical, theoretical and conceptual skills required to combine moving images.

**Prerequisite(s):** VSFX 210; VFX 210; ITGM 236; ITGM 240; GAME 236; ANIM 249 or ANIM 250.

**Attributes:** Studio Elective Requirement

**VFX 425 Photorealistic Rendering (5 Credits)**

This course explores concepts in 3D digital materials, lighting and rendering and developing techniques to create the illusion of a "real" world utilizing 3D computer graphics. Students gain understanding of and skills with lighting tools, including 3D and 2D applications, as well as a variety of rendering techniques.

**Prerequisite(s):** VSFX 210; VFX 210; ITGM 236; ITGM 240; GAME 236; ANIM 249; ANIM 250 or MOME 401.

**Attributes:** Studio Elective Requirement

**VFX 428 Particles and Procedural Effects (5 Credits)**

This course investigates visual effects techniques including particle systems, rigid body dynamics and fluid simulations. Students explore aspects of particles and procedural effects. Professional workflows and presentation skills are also emphasized.

**Prerequisite(s):** VSFX 350 or VFX 350.

**Attributes:** Studio Elective Requirement

**VFX 437 Advanced Compositing (5 Credits)**

In this course students gain proficiency in complex and state-of-the-art digital compositing techniques and apply these skills to the creation of professional portfolio pieces that showcase technical and artistic mastery. Individual research and personal creative direction are encouraged and supported. Topics of study include advanced green screen techniques, 3D matchmoving and integration, depth compositing, stereoscopic compositing techniques and other developing techniques and areas of interest.

**Prerequisite(s):** VSFX 270 or VFX 220.

**Attributes:** Studio Elective Requirement

**VFX 440 Character Effects Cloth Pipeline (5 Credits)**

This course explores techniques for clothing creation, dynamic movement and animator control that support the overall aesthetic and tone of the animated story. Students bring animated characters to life and make their stories believable through digital clothing methods and techniques.

**Prerequisite(s):** ANIM 369; ANIM 354; VFX 350 or VSFX 350.

**Attributes:** Studio Elective Requirement

**VFX 447 Models and Miniatures (5 Credits)**

Students learn traditional hands-on techniques for the building of models, miniature environments and set extensions. Methodologies to combine these creations into believable visual effects scenes both with and without live action elements are explored. Through direct and hands-on exposure to miniature construction, finishing and photography, students develop the skills required to produce a visual effects shot utilizing models—rather than or in addition to computer graphics or optical effects techniques. The context of these types of practical effects is set through the use of film clips and examples, as well as discussion of the methodologies used throughout film history.

**Prerequisite(s):** (VSFX 210; VFX 210 or PROD 221).

**Attributes:** Studio Elective Requirement

**VFX 448 Visual Effects Studio I (5 Credits)**

In this course, students are introduced to the preproduction phase including analysis and critique, organization and scheduling. The goal is to create a coherent body of work expressing students artistic visions through acquired skills.

**Prerequisite(s):** VFX 408 or VSFX 406.

**Attributes:** Studio Elective Requirement

**VFX 479 Undergraduate Internship (5 Credits)**

Internships offer students valuable opportunities to work in a professional environment and gain firsthand experience to help them prepare for careers. In an approved internship setting, a student typically spends one quarter working with an on-site professional supervisor and a faculty internship supervisor to achieve specific goals and objectives related to the program of study.

**VFX 488 Visual Effects Studio II (5 Credits)**

Students create a coherent body of work expressing their personal artistic visions through acquired skills. Students visually document their technical skills, showcasing their mastery of production-level techniques, tools, and software. Students adhere to industry standards of artistry and aesthetics, reflecting the latest trends and practices. In addition to technical skill, students demonstrate effective teamwork and collaboration by engaging in regular discussions with classmates, incorporating their feedback into the work.

**Prerequisite(s):** VFX 448; VSFX 408 or ANIM 448.

**Attributes:** Studio Elective Requirement

**VFX 501 Digital 3D Effects (5 Credits)**

This course covers many of the essential aspects of 3D modeling, texturing, lighting and effects animation for use in the visual effects industry. Professional workflows, techniques and presentation skills are emphasized throughout the course.

**Attributes:** Studio Elective Requirement

**VFX 502 Programming 3D Models and Shaders (5 Credits)**

Students taking this course are introduced to the RenderMan Scene Description Language (RIB) and the RenderMan Shading Language (RSL). Pixar's RenderMan is a widely used rendering technology used for feature animated and special effects film production. The basics of Python and MEL scripting are also covered.

**Attributes:** Studio Elective Requirement

**VFX 503 Cinematography for Visual Effects (5 Credits)**

This course explores the art and technique of photography for films with visual effects. Students learn the technical and aesthetic aspects of practical camera work. They also study camera composition and motion specific to a 3D digital space as part of the process to visualize scenes in a movie before filming begins. Other concepts, such as shot definition, framing and timing, are addressed.

**Attributes:** Studio Elective Requirement

**VFX 505 Animation Character Set-up (5 Credits)**

This course explores simple principles of modeling and rigging as applied to a series of character technical direction challenges. Students explore digital tools and apply them to various anatomical problems to find modeling and rigging solutions to abet character motion. Emphasis is placed on proper identification of controls for the end user.

**Attributes:** Studio Elective Requirement

**VFX 705 Programming Concepts for Visual Effects (5 Credits)**

Students gain introductory knowledge of the LINUX/UNIX environment and how it relates to text editing and file management. In addition, the foundations of programming languages are covered utilizing LINUX/UNIX shell scripting, PERL, MEL, C++ or similar programming.

**Attributes:** Studio Elective Requirement

**VFX 708 Modeling for Visual Effects (5 Credits)**

This course covers many of the essential aspects of 3D modeling, texturing, lighting and animation for use in the visual effects industry. Professional workflows, techniques and presentation skills are emphasized and encouraged throughout the course.

**Attributes:** Studio Elective Requirement

**VFX 709 Visual Effects Theory and Application (5 Credits)**

In this course, theoretical and practical study methods are used to inform and develop students' practices. By integrating historical studies, theory and practice, students address issues central to the visual effects industry and develop conceptual ideologies.

**VFX 715 Digital Compositing I: The Art and Science of Digital Integration (5 Credits)**

This course introduces high-end digital multilayering. Techniques and aesthetic issues are explored to produce time-based imagery. Students acquire and integrate aesthetically driven live-action imagery into broadcast or visual effects projects utilizing a wide range of media formats.

**Attributes:** Studio Elective Requirement

**VFX 721 Procedural Modeling and Animation for Production (5 Credits)**

Students learn about the techniques of procedural modeling and animation used in visual effects film. Students use procedural modeling techniques and camera techniques and prepare documentation required in visual effects productions. The end result is a visual effects portfolio of professional quality.

**Prerequisite(s):** VSFX 705 or VFX 705.

**Attributes:** Studio Elective Requirement

**VFX 728 Particles and Procedural Effects: Stochastic and Calculated Methodologies (5 Credits)**

This course explores advanced visual effects techniques including particle systems, rigid body dynamics and fluid simulations. Using industry standard software, students explore innovations in atmospheric effects, aspects of particles and procedural methodologies. Professional workflows and presentation skills are practiced and emphasized throughout the course.

**Prerequisite(s):** CMPA 725; VSFX 721 or VFX 721.

**Attributes:** Studio Elective Requirement

**VFX 735 Visual Effects Studio I: Preproduction (5 Credits)**

Students define a personal vision creating visual effects for film. Concentrating on the design of visual effects sequences, specific attention is directed toward the development of scripts, storyboards, shot breakdowns, animatics, technical direction documents, estimates and schedules in the planning process. As preparation for thesis work, this course is flexible with a strong emphasis on critique.

**Prerequisite(s):** VSFX 709; VFX 709 or CMPA 717.

**Attributes:** Studio Elective Requirement

**VFX 748 Visual Effects M.A. Studio (5 Credits)**

This course focuses on production of visual effects for student demonstration DVDs and reels. Students choose sequences and software, while the professor oversees production and completion. Collaboration between students with complementary technical and creative specializations is stressed as a reflection of professional industry practice. Emphasis is placed on creative and technical problem-solving for image acquisition, image simulation, visual composition and element compositing.

**Prerequisite(s):** (VSFX 709 or VFX 709) and minimum score of 5 in 'Graduate Prerequisite Test'.

**Attributes:** Studio Elective Requirement

**VFX 749 Visual Effects Portfolio (5 Credits)**

Students focus on the integration of imagery, websites, video and various elements into a visual effects portfolio. Students are expected to learn and apply effective tools for self-promotion, including a reel, CD compilation, website, cover letter and résumé. Proper and effective marketing techniques, interviewing techniques, job search strategies and business practices are covered to provide an understanding of operations in the effects industry. M.A. students enroll in this course during their final quarter of the visual effects program.

**Prerequisite(s):** (VSFX 709 or VFX 709) and minimum score of 5 in 'Graduate Prerequisite Test'.

**Attributes:** Studio Elective Requirement

**VFX 752 3D Color, Lighting, and Rendering (5 Credits)**

Students develop believable lighting and rendering solutions for environments in both live-action integration and computer-generated scenes. Students understand the lighting tools available as well as a variety of rendering techniques to create believable lighting situations.

**Prerequisite(s):** VSFX 709; VFX 709 or ANIM 709.

**Attributes:** Studio Elective Requirement

**VFX 755 Procedural 3D and Shader Programming (5 Credits)**

This course is an in-depth study of programming techniques used to develop the artistic vision of a 3D environment. Industry-standard shader language is used to create rendering effects for the production of still images and animations using the most prevalent software in the industry.

**Prerequisite(s):** VSFX 705 or VFX 705.

**Attributes:** Studio Elective Requirement

**VFX 758 Digital Compositing II: Advanced Studies of Multi-layered Integration (5 Credits)**

In this course, students learn advanced multi-layering techniques combining CGI, live action and graphics to resolve complex problems in motion design and visual effects technologies.

**Prerequisite(s):** CMPA 705; VSFX 715 or VFX 715.

**Attributes:** Studio Elective Requirement



**VFX 762 Matte Painting: Photo-realistic Environment Creation (5 Credits)**

This course addresses the role of digital matte painting in augmenting the visual environment; students apply this technique to the re-creation of both realistic and fantasy scenes. Issues such as color, space, depth and perspective as painting techniques are explored. The elements created in the course may be used with 3D elements and composited for other projects.

**Prerequisite(s):** VSFX 708; VFX 708 or ANIM 709.

**Attributes:** Studio Elective Requirement

**VFX 775 Visual Effects Studio II: Production (5 Credits)**

Students analyze the possibilities and constraints of visual effects design as they refine an entire visual effects vision for visual effects sequences.

The course is flexible with a strong emphasis on thought processes, aesthetics and research.

**Prerequisite(s):** (CMPA 741; VSFX 735 or VFX 735) and minimum score of 6 in 'Graduate Prerequisite Test'.

**Attributes:** Studio Elective Requirement

**VFX 779F Graduate Field Internship (5 Credits)**

Students in this course undertake a field assignment under the supervision of a faculty member.

**VFX 779T Graduate Teaching Internship (5 Credits)**

Students in this course undertake a teaching or field assignment under the supervision of a faculty member.

**VFX 790 Visual Effects M.F.A. Thesis (5 Credits)**

The visual effects M.F.A. degree program culminates with completion of a graduate-level thesis that presents a mature, resolved body of work, and demonstrates advanced professional competence through mastery of the technical, creative and aesthetic elements of the discipline. Based on original research, ideation and concept development, students earning a M.F.A. in visual effects create original cinematographic, photorealistic and stylized visual effects that demonstrate advanced professional standards in technical expertise, artistry and aesthetics, and contribute to the scholarly and creative advancement of the discipline.

**Prerequisite(s):** (CMPA 741; VSFX 735 or VFX 735) and minimum score of 6 in 'Graduate Prerequisite Test'.