



Digarted project – the Digital Art Courses in Higher Education Institutions
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Digital Art Courses in Higher Education Institutions

Digarted project



Pedagogical Framework (Curriculum) on Digital Arts for one core and one elective digital art course



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The Core Course Title: *Fundamentals of 2D Graphics and Multimedia*

Course Description:

The course delves into the practical applications of digital art, focusing on multimedia and digital graphics techniques. Students will gain a solid understanding of the fundamentals of 2D artwork creation. They will learn the workflow essentials for professional teams to achieve optimal artistic goals. Through lectures, discussions, workshops, and individual projects, students will master tools and software for creating various multimedia forms such as short films, animations, title sequences, music clips, and advertising clips. Additionally, students will learn animation principles, video editing techniques, and sound editing basics.

Course duration is one semester - 15 weeks.

Prerequisites:

The following prerequisites are required to ensure students have the necessary foundation to succeed in the Fundamentals of 2D Graphics and Multimedia course,

- **Basic Computer Skills:** Students should possess basic computer literacy, including familiarity with operating systems (e.g., Windows, MacOS) and file management.
- **Understanding of Digital Imaging Concepts:** Knowledge of basic digital imaging concepts such as pixels, resolution, and file formats.
- **Basic Graphic Design Knowledge:** Familiarity with fundamental graphic design principles such as composition, typography, and color theory will be beneficial.
- **Introduction to Multimedia Concepts:** An introductory understanding of multimedia concepts like image, video, and audio formats is helpful.
- **Proficiency in Digital Tools:** Basic proficiency in using digital design software such as Adobe Photoshop, Adobe Illustrator, or similar tools is advantageous. Useful may be knowledge in the field of animation or editing, advantageous will be familiarity with software such as Adobe After Effects, Adobe Premiere Pro, or Adobe Audition, or similar software
- **Basic Animation Knowledge:** A basic understanding of animation principles, such as timing and movement, will provide a solid foundation for learning advanced animation techniques.
- **Basic Video Editing Skills:** Familiarity with basic video editing concepts such as timeline editing, transitions, and effects will be beneficial for understanding advanced video editing techniques covered in the course.
- **Introduction to Audio Editing:** An introductory understanding of audio editing concepts such as sound manipulation, mixing, and exporting will be helpful for the sound editing portion of the course.

Students without prior experience in these areas are encouraged to acquire relevant skills through self-study or introductory courses before enrolling in the Fundamentals of 2D Graphics and Multimedia course <http://www.digarted.eu/project-results/>

Teaching Methods:

The course employs topic-based lectures with real-world examples to illustrate concepts. Discussions during lectures and workshops foster collaborative learning, while continual supervision of individual projects ensures hands-on practice. Small design tasks allow students to apply their knowledge in practical scenarios.

Course Content:

- Pipeline for the Creation of Digital Imaging and Motion Graphics: Understanding the step-by-step process for creating digital imagery and motion graphics.
- Digital Formats and Image Channels: Exploring image formats, compression techniques, and metadata management.
- Color Models, Color Space, and Bit Depth: Understanding color theory, color space, and bit depth to manipulate digital images effectively.
- 2D Primitives and Transformation, Layers: Learning about basic shapes, transformations, and layer management in digital graphics.
- Selections, Boolean Operations, Splines, and Masking: Techniques for making precise selections, performing boolean operations, creating splines, and applying masking in graphic design.
- Vector and Raster Graphics, DPI: Differentiating between vector and raster graphics and understanding the importance of DPI in digital design.
- Typography: Exploring the principles of typography and its application in digital design.
- Principles of Animation: Learning fundamentals of timing, spacing, and anticipation in animation.
- Animation Techniques: Exploring various animation techniques, including keyframing, tweening, and rigging.
- Effects and Plugins for Animation: Introduction to effects and plugins to enhance animations and create dynamic visual effects.
- Digital Virtual Camera: Understanding motion blur, z-depth, and optical flares to simulate real-world camera effects in digital animation.
- Video Editing: Learning video editing basics, including workspace organization, footage management, and application of transitions and effects.
- Video Editing and Postproduction: Advanced video editing techniques such as color correction and export for final production.
- Sound Recording: Understanding microphone types, digital formats, and industry standards for sound recording.
- Sound Editing and Design: Basics of sound editing, including metering, mixing, and exporting audio tracks for multimedia projects.

Final Project:

The culmination of the course will be a short 2D animation project where students will apply the concepts and techniques learned throughout the course to create a compelling multimedia piece.

Final Project Learning Outcome:

Students apply acquired skills and knowledge to plan, design, and produce a short 2D animation project, demonstrating proficiency in 2D graphics and multimedia production.

Expected Learning Outcomes:

By the end of the course, students will have acquired the skills and knowledge necessary to successfully create and manipulate digital graphics, animations, and multimedia content, making them proficient in various aspects of 2D graphics and multimedia production. Upon successful completion of the course, students will be able to:

- Understand and apply the step-by-step pipeline for creating digital imaging and motion graphics.
- Identify and select appropriate digital formats, apply compression techniques, and manage metadata effectively.
- Analyze and manipulate color using various color models, understand color space and adjust bit depth for optimal digital image quality.
- Create and manipulate 2D primitives, apply transformations, and manage layers in digital graphics software.
- Make precise selections, perform boolean operations, create splines, and apply masking techniques in graphic design projects.
- Differentiate between vector and raster graphics, and understand the significance of DPI in digital design.
- Apply principles of typography effectively in digital artwork.
- Demonstrate understanding of fundamental animation principles such as timing, spacing, and anticipation.
- Apply various animation techniques, including keyframing, tweening, and rigging to create dynamic animations.
- Utilize effects and plugins to enhance animations and create visually appealing effects.
- Simulate real-world camera effects such as motion blur, depth, and optical flares.
- Organize footage, apply transitions and effects and perform basic video editing tasks proficiently.
- Perform advanced video editing techniques including color correction and export for final production.
- Understand microphone types, digital formats, and industry standards for sound recording.
- Edit sound effectively, including metering, mixing, and exporting audio tracks for multimedia projects.

The Elective Course Title: *Fundamentals of 3D Graphics*

Course Description:

This elective course delves into the practical applications of 3D graphics, focusing on developing skills in 3D modeling, texturing, lighting, and rendering. Students will gain an understanding of creating scenes in a 3D environment. They will learn to work effectively as part of a professional team in the 3D production pipeline. Through lectures, discussions, workshops, and individual projects, students will master tools and software for creating detailed 3D models, applying textures and materials, setting up scenes for rendering, and conducting basic post-production. Additionally, students will explore principles of camera framing techniques, color theory, and design as they apply to 3D graphics.

Course duration is one semester - 15 weeks.

Prerequisites:

To ensure students have the necessary foundation to succeed in the Fundamentals of 3D Graphics course, the following prerequisites are required:

- **Basic Understanding of 3D Graphics Concepts:** Familiarity with basic concepts such as 3D coordinate systems, transformations, and modeling will be beneficial.
- **Proficiency in Digital Tools:** Basic proficiency in using 3D modeling software such as Blender, Maya, or 3ds Max is advantageous.
- **Introduction to Digital Imaging Concepts:** Prior knowledge of basic digital imaging concepts such as pixels, resolution, and file formats is recommended.
- **Basic Graphic Design Knowledge:** Understanding of fundamental graphic design principles such as composition, typography, and color theory will be beneficial.
- **Introduction to Multimedia Concepts:** An introductory understanding of multimedia concepts including image, video, and audio formats is helpful.
- **Understanding of UV Mapping:** Prior knowledge of UV mapping techniques for applying textures to 3D models is recommended.
- **Basic Understanding of Lighting and Rendering:** Familiarity with basic concepts of lighting and rendering in 3D graphics will be beneficial.
- **Basic Understanding of Camera Techniques:** An introductory understanding of camera techniques such as framing and composition will provide a foundation for learning about the virtual camera.
- **Introduction to 3D Modeling Techniques:** Prior exposure to low and high poly modeling techniques will be advantageous.
- **Introduction to Photogrammetry and Retopology:** Familiarity with photogrammetry techniques for capturing real-world objects and retopology for optimizing 3D models is recommended.
- **Basic Understanding of Render Passes and Compositing:** Prior knowledge of render passes and compositing techniques for post-processing effects is beneficial.
- **Introduction to Simulations:** Familiarity with basic concepts of simulations for creating realistic effects such as physics simulations and particle systems will be helpful.
- **Introduction to Real-Time Rendering:** Prior exposure to real-time rendering techniques for interactive applications and games is advantageous.

Students without experience in these areas are encouraged to acquire relevant skills through self-study or introductory courses before enrolling in the Fundamentals of 3D Graphics course. <http://www.digarted.eu/project-results/>

Teaching Methods:

The course employs topic-based lectures with real-world examples to illustrate concepts. Discussions during lectures and workshops foster collaborative learning, while continual supervision of individual projects ensures hands-on practice. Small design tasks allow students to apply their knowledge in practical scenarios.

Course Content:

- Pipeline for Building 3D Scene
- 3D Space and Transformations
- Modeling
- UV Mapping
- Texturing
- Materialization
- Lighting and Rendering
- HDRi Lighting and Texturing
- Virtual Camera
- Low and High Poly Modeling
- Photogrammetry and Retopology
- Render Passes
- Compositing
- Simulations
- Real-Time Rendering

Final Project:

The culmination of the course will be a 3D scene project where students will apply the concepts and techniques learned throughout the course to create a visually stunning and cohesive 3D environment.

Expected Learning Outcomes:

Upon successful completion of the course, students will be able to:

- Understand and apply the step-by-step pipeline for building 3D scenes.
- Create detailed 3D models using various modeling techniques.
- Apply textures, materials, and shaders to 3D models effectively.
- Set up lighting and render scenes to produce high-quality images.
- Utilize HDRi lighting and texturing techniques for realism in 3D scenes.
- Frame and capture 3D scenes effectively using virtual camera settings.

- Differentiate between low and high poly modeling techniques and apply them appropriately.
- Utilize photogrammetry and retopology techniques for optimizing 3D models.
- Use render passes and compositing techniques for post-processing effects.
- Create simulations for realistic effects in 3D scenes.
- Implement real-time rendering techniques for interactive applications.

Final Project Learning Outcome:

Students apply acquired skills and knowledge to plan, design, and produce a 3D scene project, demonstrating proficiency in 3D graphics production.