



## BSc in Computer Graphics and Animation Course Description

12159	<p>Computer Application in Computer Graphics <b>Prerequisite:</b> 11102 <b>Credit Hours: 3</b></p> <p>This course introduces students to the principles and basics of Computer Applications in Computer Graphics. Students apply their newly gained skills by creating a variety of media projects in order to practice basic techniques. This course includes some computer graphics software and tools that enable students to create their own design and multimedia projects. Students will learn through practice, group or individual projects, lectures, critique sessions, screening and design discussion.</p>
12243	<p>Webpage Design and Internet programming <b>Co-requisite:</b> 11206 <b>Credit Hours: 3</b></p> <p>The course aims to equip students with the necessary knowledge and skills to design and implement Internet-based applications. Topics include the specific technologies of these applications (including markup language(s), styling, client and server side programming) and how to employ them in building effective and efficient interactive applications. Students will learn about various website design and development best practices.</p>
12264	<p>3D-Modeling <b>Prerequisite:</b> 12259 <b>Credit Hours: 3</b></p> <p>This course focuses mainly on introducing 3D modeling for hard surface objects and environments using advanced 3D software. Students will be able to create 3D worlds and props through the application of several tools and methods.</p>
12266	<p>3D Materials and Lighting <b>Prerequisite:</b> 12264 <b>Credit Hours: 3</b></p> <p>This course offers knowledge in 3D texturing, lighting, and rendering. Students will be able to unfold any given 3D model in addition to manipulating materials and shaders to make them ready for the rendering process.</p>
12267	<p>Video Editing and Production <b>Prerequisite:</b> 12159 <b>Credit Hours: 3</b></p> <p>This course focuses mainly on introducing the concepts and rules of cinematography. In addition to giving the opportunity for students to film and direct their own short movies, as well as direct, edit, and add cinematographic effects.</p>

12273	<p>Computer Graphics</p> <p><b>Prerequisite:</b> 11103</p> <p><b>Credit Hours: 3</b></p> <p>This course aims at teaching students the principles of 3D Computer Graphics. Students will learn the basics of real-time rendering, shading and lighting, modeling, materials, projections, and post-processing.</p>
12275	<p>Data Structures for Games</p> <p><b>Prerequisite:</b> 11206, <b>12273</b></p> <p><b>Credit Hours: 3</b></p> <p>This course provides students with core programming concepts, and how to apply those concepts when you develop games. It aims to teach the fundamental principles of object-oriented programming and data structures. Students will apply these skills to develop interactive graphics applications. Students will also learn fundamental techniques used in game development, such as delegates, UI, and events.</p>
12324	<p>Human Computer Interaction</p> <p><b>Prerequisite:</b> 11206</p> <p><b>Credit Hours: 3</b></p> <p>This course is an introduction to human-computer interaction, where emphasis is placed on understanding human behavior with computing systems, knowing how to design and evaluate interactive software using a human-centered approach, as well as a general knowledge of HCI design issues and solutions with multiple types of interactive software.</p>
12348	<p>Multimedia Systems</p> <p><b>Prerequisite:</b> 11206</p> <p><b>Credit Hours: 3</b></p> <p>This is an introductory course to Multimedia Systems. In this course, students will be introduced to principles and current technologies of multimedia system design and gain hands-on experience in this area. Topics include multimedia systems design, multimedia hardware and software, effective representation, processing, and retrieval of multimedia data such as text, graphics, sound and music, image and video.</p>
12351	<p>Game Design</p> <p><b>Prerequisite:</b> 12273</p> <p><b>Credit Hours: 3</b></p> <p>The course covers the fundamental aspects and topics of game design concepts, such as game elements, scenarios, strategies, etc.</p>
12354	<p>Algorithms and AI for Games</p> <p><b>Prerequisite:</b> <b>12275</b></p> <p><b>Credit Hours: 3</b></p> <p>This course introduces formal techniques of the design and analysis of algorithms. The course will expose students to AI approaches used in games development. Students will also learn some of the algorithms used for game such as hide, seeks, evade algorithms, pursuit, flocking, and crowd simulation, etc.</p>

12362	<p>2D Animation</p> <p><b>Prerequisite:</b> 12267</p> <p><b>Credit Hours:</b> 3</p> <p>This course presents theoretical and practical training on the basics of drawing, in addition to animate objects and characters digitally. The program covers traditional drawing by using different materials, and two-dimensional animation using the computer, as a form of digital drawing, where it is commonly used for illustration and animation.</p>
12364	<p>3D Animation</p> <p><b>Prerequisite:</b> 12264</p> <p><b>Credit Hours:</b> 3</p> <p>This course gives the ability for students to animate characters, objects, and cameras using any given rig. In addition, students will learn the 12 principles of animation, the importance of acting, and body language to utilize them in creating well-crafted animations and references.</p>
12367	<p>3D Rigging and Skinning</p> <p><b>Prerequisite:</b> 12264</p> <p><b>Credit Hours:</b> 3</p> <p>This course gives deep knowledge for students to rig and skin objects, characters, and creatures to make them ready to be used by animators.</p>
12373	<p>Interactive Computer Graphics</p> <p><b>Prerequisite:</b> 12275, 12273</p> <p><b>Credit Hours:</b> 3</p> <p>This course introduces students to the theory and practice of interactive computer graphics. It aims to teach the fundamental principles of 3D interactive computer graphics. Students will apply mathematics, physics and computer programming to develop interactive graphics applications. Students will also learn fundamental techniques used in game development, such as shooting, character animation and controllers, Inputs, and Events.</p>
12379	<p>3D Character Modeling</p> <p><b>Prerequisite:</b> 12264</p> <p><b>Credit Hours:</b> 3</p> <p>This course is designed to give students the ability to understand the anatomy and proportions of the human figure. In addition the right topology and loops in creating a 3D character.</p>
12442	<p>Game Programming</p> <p><b>Prerequisite:</b> 12351, 12354</p> <p><b>Credit Hours:</b> 3</p> <p>Game Programming course provides students with the opportunity to design and develop variety of 2D and 3D games, the course will introduce basic to advance programming and designing skills, that are essential to develop a video game such as graphic, light, material, sound, effect, script and much more, to be able to develop a game from scratch to publish, on different platforms such as mobile, web and PC.</p>

12446	<p>Digital Image Processing</p> <p><b>Prerequisite:</b> 11206,12348</p> <p><b>Credit Hours: 3</b></p> <p>This course is an introduction to image processing and image analysis techniques and concepts. students will learn digital image processing techniques including representation, sampling and quantization, image acquisition, imaging geometry, image transforms, image enhancement, image smoothing and sharpening, and image restoration. The above processing operations are examined in both the spatial domain and the frequency domain.</p>
12447	<p>User Experience</p> <p><b>Prerequisite:</b> 12324</p> <p><b>Credit Hours: 3</b></p> <p>This course provides an introduction to the areas of study categorized under the umbrella of “user experience” including design principles, psychological principles, cognitive processes, visual perception and the importance of usability over aesthetics.</p>
12448	<p>Computer Vision</p> <p><b>Prerequisite:</b> 12446</p> <p><b>Credit Hours: 3</b></p> <p>This course provides an introduction to computer vision, including fundamentals of image formation, camera imaging geometry, feature detection and matching, stereo, motion estimation and tracking, image classification. Students will learn the basic methods for applications that include finding known models in images, depth recovery from stereo, camera calibration.</p>
12449	<p>Usable Security and Privacy</p> <p><b>Prerequisite:</b> 12324</p> <p><b>Credit Hours: 3</b></p> <p>This course introduces students to various aspects of user experience (e.g. usability issues, user-center design, user interface, human factors) related to privacy and security systems. It also provides students with the knowledge to analyze, design and evaluate the user experience of privacy and security systems.</p>
12455	<p>Selected Topics in Games</p> <p><b>Prerequisite:</b> 12373</p> <p><b>Credit Hours: 3</b></p> <p>This course introduces advanced or new topics in one of the areas of games.</p>
12461	<p>Visual and Sound Effects</p> <p><b>Prerequisite:</b> 12348</p> <p><b>Credit Hours: 3</b></p> <p>This course provides students with exposure to the design, creation and production of audio in interactive applications and computer games. Students will become familiar with the use of sound libraries, recording sounds in the studio and in the field, generating sound with synthesizers, and effects processing. Students will create sound designs for interactive media, integrating music, dialog, ambient sound, sound effects and interface sounds within interactive programs.</p>
12462	<p>Selected Topics in 2D Animation</p> <p><b>Prerequisite:</b> 12362</p> <p><b>Credit Hours: 3</b></p> <p>The objective of this course is to introduce advanced or new topics in one of the areas of 2D animation.</p>

12471	<p>Selected Topics in Computer Animation</p> <p><b>Prerequisite: 12364</b></p> <p><b>Credit Hours: 3</b></p> <p>The objective of this course is to introduce advanced or new topics in one of areas in computer animation, film production, and digital media. The department council will specify the course subject and prerequisite.</p>
12473	<p>Selected Topics in Computer Graphics</p> <p><b>Prerequisite: 12273</b></p> <p><b>Credit Hours: 3</b></p> <p>The objective of this course is to introduce advanced and new topics in one of the areas of computer graphics. The department council will specify the course subject and prerequisite.</p>
12481	<p>Virtual and Augmented Reality</p> <p><b>Prerequisite: 12373</b></p> <p><b>Credit Hours: 3</b></p> <p>This course teaches students the main principles of VR and AR applications. Students will learn the required tools for successful VR and AR applications, including interacting with virtual objects, and tracking methods. Students will learn to build different types of AR apps including location-based and vision-based tracking methods.</p>
12491	<p>Practical Training</p> <p><b>Prerequisite: Finish 90 Credit Hours</b></p> <p><b>Credit Hours: 3</b></p> <p>As part of the requirements of the Computer Graphics and Animation department, students need to complete field training, where Computer Graphics and Animation a portion of their education period in the industry is considered a graduation requirement and necessary for obtaining the degree. Therefore, the department collaborates with private and public institutions to provide suitable training opportunities for students.</p>
12494	<p>Graduation Project(1)</p> <p><b>Prerequisite: Finish 90 Credit Hours</b></p> <p><b>Credit Hours: 1</b></p> <p>Graduation Project 1 offers students an immersive experience to showcase their skills and creativity. Under faculty guidance, students will apply their knowledge in areas like 2D and 3D modeling, animation techniques, and visual effects. Graduation Project 1 hones their problem-solving abilities, project management skills, and technical proficiency. The project is discussed by a committee of faculty members.</p>
12495	<p>Graduation Project(2)</p> <p><b>Prerequisite: 12494</b></p> <p><b>Credit Hours: 2</b></p> <p>Graduation Project (2) is a continuation of Graduation Project (1), where the student submits the final programs and projects that were agreed upon with the department in Graduation Project (1). These graduation projects can be in two-dimensional drawings, three-dimensional drawings, game design, or scientific research in the field of Computer Graphics. The project is discussed by a committee of faculty members.</p>