



BSc Computer Graphics and Animation Course Description

12162	<p>Fundamentals of Drawing and 2D Animation Prerequisite: None Credit Hours: 3</p> <p>This course develops theoretical and practical training on the basics of drawing in addition to animating objects and characters digitally. The program covers the two-dimensional medium including the use of different materials (pencil, charcoal, pastel), tools (eraser, marker), and surfaces (cardboard, canvas). 2D Animation, as a form of digital drawing, is commonly used for illustration, animation, architecture, and engineering.</p>
12213	<p>Data Structures in Visual Programming Prerequisite: 11206, 20134 Credit Hours: 3</p> <p>This course will provide students with core programming concepts of C#, 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>
12259	<p>Computer Application in Computer Graphics Prerequisite: 11102 Credit Hours: 3</p> <p>This course introduces students to the principles and basics of Computer Applications in Computer Graphics. Students incorporate acquired knowledge into creating several media projects to practice basic techniques. Overview includes some computer graphics software and tools that enable students to create their own design and media work. Learning is conducted mainly through practice, group/individual projects, lecturing, critique sessions, showing of designs and screening of media work related to the modules.</p>
12243	<p>Webpage Design and Internet programming Co-requisite: 11206 Credit Hours: 3</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 Prerequisite: 12259 Credit Hours: 3</p> <p>This course is designed to give students the ability to create 3d models, props, and 3d environments by learning the rules of modeling for movies and games. Students will learn the tools and interface of Autodesk Maya in depth to make them able to create any desired 3d model and prepare them for the working industry.</p>

12273	<p>Computer Graphics Prerequisite: 11103 Credit Hours: 3 This course aims at teaching students the principles of 3D Computer Graphics using Unity3D. Students will learn the basics of real-time rendering, shading and lighting, modeling, materials, projections, and post-processing.</p>
12324	<p>Human Computer Interaction Prerequisite: 11206 Credit Hours: 3 This subject is an introduction to human-computer interaction. Emphasis will be placed on understanding human behavior with computing systems, knowing how to design, and evaluate interactive software using a human-centered approach, and general knowledge of HCI design issues with multiple types of interactive software.</p>
12348	<p>Multimedia Systems Prerequisite: 11206 Credit Hours: 3 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, issues in effectively representing, processing, and retrieving multimedia data such as text, graphics, sound and music, image and video.</p>
12351	<p>Game Design Co-requisite: 12273 Credit Hours: 3 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 Prerequisite: 12213 Credit Hours: 3 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>
12353	<p>3D Materials and Lighting Prerequisite: 12264 Credit Hours: 3 This course offers the 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>
12364	<p>3D Animation Prerequisite: 12264 Credit Hours: 3 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 Co-requisite: 12264 Credit Hours: 3 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 Co-requisite: 12273,12213 Credit Hours: 3 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. Unity is used as the platform for practical development.</p>
12442	<p>Game Programming Prerequisite: 12354,12351 Credit Hours: 3 Game Programming provide students with the opportunity to design and develop variety of 2D and 3D games using unity game engine, 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 Prerequisite: 11206,12348 Credit Hours: 3 This is an introductory course to digital image processing and the techniques used to manipulate digital image in both the spatial domain and the frequency domain. We will also look at the techniques used in Image restoration and segmentation for both colored and gray images. In addition, we will take a look at image compression as time permits. Many of the aspects of DIP will be practiced using MATLAB, so it is recommended that you get a copy of Matlab and start working on understanding how to write small programs in Matlab. I will introduce many of the Matlab functions and you will have the chance to practice these functions.</p>
12467	<p>Video Editing and Production Prerequisite: 12348 Credit Hours: 3 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 editing their movies using Adobe Premiere and using Adobe After Effects to add cinematographic effects.</p>
12481	<p>Virtual and Augmented Reality Prerequisite: 12373 Credit Hours: 3 This course will teach students the main principles of VR and AR applications. Students will learn the required mathematics for successful VR and AR applications, including interacting with virtual objects, and tracking methods. Students will also learn to build effective 3D interaction techniques to use VR applications such as selection, manipulation, wayfinding, menus, and teleporting. 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>Prerequisite: Finish 90 Credit Hours</p> <p>Credit Hours: 3</p> <p>The student is required to do practical training in a well known software company for period of (2) months full time training with at least (5) hours per day, or 3 months part time training with at least (4) hours per day. For the part-time training the student is allowed to register for additional (6) credit hours in the first or in the second semester, or (3) credit hours for the summer semester. The student is asked to perform there some tasks that are related to his major, such as writing, developing, or learning some new software.</p>
12494	<p>Graduation Project(1)</p> <p>Prerequisite: Finish 90 Credit Hours</p> <p>Credit Hours: 1</p> <p>The graduation project aims to develop the student's skills and ability to deal with the real issues, study them, analyze them, and computer programming to solve them. This is achieved through an integrated project that is developed by the student within a group of students and supervised by a faculty member. The student is required to complete the project objectives and submit a final report. The project is discussed by a committee of faculty members.</p>
12495	<p>Graduation Project(2)</p> <p>Prerequisite: 12494</p> <p>Credit Hours: 2</p> <p>Students are required to develop a complete implementation fulfilling the project objectives and submit a final report.</p> <p>Project must be presented to a committee of the faculty</p>
12447	<p>User Experience</p> <p>Prerequisite: 12324</p> <p>Credit Hours: 3</p> <p>This course provides introduction to the areas of study categorized under the umbrella of “user experience” including design principles, psychological principles, cognitive processes, visual perception and the important of usability over aesthetics.</p>
12448	<p>Computer Vision</p> <p>Prerequisite: 12446</p> <p>Credit Hours: 3</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, scene understanding, and deep learning with neural networks. We will develop basic methods for applications that include finding known models in images, depth recovery from stereo, camera calibration, image stabilization, automated alignment, tracking, boundary detection, and recognition. Students will develop intuitions in class, and then learn about the difference between theory and practice in projects.</p>
12455	<p>Selected Topics in Games</p> <p>Prerequisite: 12442</p> <p>Credit Hours: 3</p> <p>The objective of this course is to introduce advanced or new topics in one of the areas of games.</p>

12461	<p>Visual and Sound Effects</p> <p>Prerequisite: 12348</p> <p>Credit Hours: 3</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>
12471	<p>Selected Topics in Computer Animation</p> <p>Prerequisite: Set by the department</p> <p>Credit Hours: 3</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.</p>
12473	<p>Selected Topics in Computer Graphics</p> <p>Prerequisite: Set by the department</p> <p>Credit Hours: 3</p> <p>The objective of this course is to introduce advanced and new topics in one of the areas of computer graphics.</p>
12479	<p>Advanced Animation</p> <p>Prerequisite: 12364</p> <p>Credit Hours: 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>
12343	<p>Visual Programming</p> <p>Prerequisite: 11206</p> <p>Credit Hours: 3</p> <p>This course aims to introduce the students who have built a solid background in console systems to the concepts of Visual/GUI design using structured and OO programming skills acquired in previous courses. Topics include Windows Forms and Controls, Event-Driven Programming, Error Handling, Files, Multi-threading, Animation as well as Data Driven Systems. The course also includes a design project, which brings together students coding, and user-interface design principles. After completing this course, the students are ready to undertake professional projects with added business value for clients within a Software Engineering or Systems Analysis context.</p>
12242	<p>Web Design and internet programming Lab</p> <p>Co-requisite: 12343</p> <p>Credit Hours: 1</p> <p>Laboratory sessions on how to design interactive and dynamic WebPages. Technologies/Languages: HTML, CSS, JavaScript, and PHP.</p>

