

Government of Pakistan

National Vocational and Technical Training Commission

Prime Minister's Hunarmand Pakistan Program

"Skills for All"



Course Contents/ Lesson Plan

Course Title: 3D Animation VR & Simulation

Duration: 6 Months

Revised Edition

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| Trainer Name | |
| Course Title | 3D Animation, VR & SIMULATION |
| Objectives and Expectations | <p>Employable skills and hands-on practice for 3D Animation, Virtual Reality, and Simulation</p> <p>This six months program in 3D Animation VR & Simulation is a comprehensive training in 3D using industry standard software such as Autodesk Maya, Epic Unreal for VR & Gaming, Marvelous Designer for cloth creation and various compositing & image processing tools.</p> <p>Students in this six months program have the opportunity to learn the technical and artistic tools they need to master 3d animation & simulation technologies After completion of the program, the candidate will be able to explore their career in:</p> <ul style="list-style-type: none"> • AAA Game Studios • VR & AR Applications • Production Houses • INDIE game Houses • Freelance Market • Architectural Visualization • Film Production • TV Commercials • TV Channels • Education • Simulation <p><u>Main Expectations:</u></p> <p>In short, the course under reference should be delivered by professional instructors in such robust hands- on manner that the trainees are comfortably able to employ their skills for earning money (through wage/self-employment) at its conclusion.</p> <p>This course thus clearly goes beyond the domain of the traditional training practices in vogue and underscores an expectation that a market centric approach will be adopted as the main driving force while delivering it. The instructors should therefore be experienced enough to be able to identify the training needs for the possible market roles available out there. Moreover, they should also know the strengths and weaknesses of each individual trainee to prepare them for such market roles during/after the training.</p> <p>i. Specially designed practical tasks to be performed by the trainees have been included in the Annexure-I to this document. The record of all tasks performed individually or in groups must be preserved by the management of the training Institute clearly labeling name, trade, session etc so that these are ready to be physically inspected/verified through monitoring visits from time to time. The weekly distribution of tasks has also been indicated in the weekly lesson plan given in this document.</p> |

ii. In order to materialize the main expectations, a special module on **Job Search & Entrepreneurial Skills** has been included in the later part of this course (5th & 6th month) through which, the trainees will be made aware of the Job search techniques in the local as well as international job markets (Gulf countries). Awareness around the visa process and immigration laws of the most favoured labour destination countries also forms a part of this module. Moreover, the trainees would also be encouraged to venture into self-employment and exposed to the main requirements in this regard. It is also expected that a sense of civic duties/roles and responsibilities will also be inculcated in the trainees to make them responsible citizens of the country.

iii. A module on **Work Place Ethics** has also been included to highlight the importance of good and positive behavior at work place in the line with the best practices elsewhere in the world. An outline of such qualities has been given in the Appendix to this document. Its importance should be conveyed in a format that is attractive and interesting for the trainees such as through PPT slides +short video documentaries. Needless to say that if the training provider puts his heart and soul into these otherwise non-technical components, the image of Pakistani workforce would undergo a positive transformation in the local as well as international job markets.

In order to maintain interest and motivation of the trainees throughout the course, modern techniques such as:

- Motivational Lectures
- Success Stories
- Case Studies

These techniques would be employed as an additional training tool wherever possible (these are explained in the subsequent section on Training Methodology).

Lastly, evaluation of the competencies acquired by the trainees will be done objectively at various stages of the training and proper record of the same will be maintained. Suffice to say that for such evaluations, practical tasks would be designed by the training providers to gauge the problem solving abilities of the trainees.

(i) **Motivational Lectures**

The proposed methodology for the training under reference employs motivation as a tool. Hence besides the purely technical content, a trainer is required to include elements of motivation in his/her lecture. To inspire the trainees to utilize the training opportunity to the full and strive towards professional excellence. Motivational lectures may also include general topics such as the importance of moral values and civic role & responsibilities as a Pakistani. A motivational lecture should be delivered with enough zeal to produce a deep impact on the trainees. It may comprise of the following:

- Clear Purpose to convey message to trainees effectively.
- Personal Story to quote as an example to follow.
- Trainees Fit so that the situation is actionable by trainees and not represent a just idealism.

- Ending Points to persuade the trainees on changing themselves.

A good motivational lecture should help drive creativity, curiosity and spark the desire needed for trainees to want to learn more.

Impact of a successful motivational strategy is amongst others commonly visible in increased class participation ratios. It increases the trainees' willingness to be engaged on the practical tasks for longer time without boredom and loss of interest because they can clearly see in their mind's eye where their hard work would take them in short (1-3 years); medium (3 -10 years) and long term (more than 10 years).

As this tool is expected that the training providers would make arrangements for regular well planned motivational lectures as part of a coordinated strategy interspersed throughout the training period as suggested in the weekly lesson plans in this document.

Course related motivational lecture online link is available in **annexure II**.

(ii) Success Stories

Another effective way of motivating the trainees is by means of Success Stories. Its inclusion in the weekly lesson plan at regular intervals has been recommended till the end of the training.

A success story may be disseminated orally, through a presentation or by means of a video/documentary of someone that has risen to fortune, acclaim, or brilliant achievement. A success story shows how a person achieved his goal through hard work, dedication and devotion. An inspiring success story contains compelling and significant facts articulated clearly and easily comprehensible words. Moreover, it is helpful if it is assumed that the reader/listener knows nothing of what is being revealed. Optimum impact is created when the story is revealed in the form of:-

- Directly in person (At least 2-3 cases must be arranged by the training institute)
- Through an audio/ videotaped message (2-3 high quality videos must be arranged by the training institute)

It is expected that the training provider would collect relevant high quality success stories for inclusion in the training as suggested in the weekly lesson plan given in this document.

Suggestive structure and sequence of a sample success story and its various shapes can be seen at **annexure III**.

(iii) Case Studies

Where a situation allows, case studies can also be presented to the trainees to widen their understanding of the real life specific problem/situation and to explore the solutions.

In simple terms, the case study method of teaching uses a real life case example/a typical case to demonstrate a phenomenon in action and explain theoretical as well as practical aspects of the knowledge related to the same. It is an effective way to help the trainees comprehend in depth both the theoretical and practical aspects of the complex phenomenon in depth with ease. Case teaching can also stimulate the trainees to participate in discussions and thereby boost their confidence. It also makes class room

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| | <p>atmosphere interesting thus maintaining the trainee interest in training till the end of the course.</p> <p>Depending on suitability to the trade, the weekly lesson plan in this document may suggest case studies to be presented to the trainees. The trainer may adopt a power point presentation or video format for such case studies whichever is deemed suitable but it's important that only those cases are selected that are relevant and of a learning value.</p> <p>The Trainees should be required and supervised to carefully analyze the cases.</p> <p>For the purpose they must be encouraged to inquire and collect specific information / data, actively participate in the discussions and intended solutions of the problem / situation.</p> <p>Case studies can be implemented in the following ways: -</p> <ol style="list-style-type: none"> i. A good quality trade specific documentary (At least 2-3 documentaries must be arranged by the training institute) ii. Health & Safety case studies (2 cases regarding safety and industrial accidents must be arranged by the training institute) <p>Field visits(At least one visit to a trade specific major industry/ site must be arranged by the training institute)</p> |
| <p>Entry-level of trainees</p> | <p>Qualification: Intermediate</p> <p>Assessment Test Successfully pass general assessment test that includes a computer knowledge assessment, Internet knowledge assessment, English reading and writing skills assessment.</p> <p>English Proficiency International students with English as a second language must demonstrate a good oral and written level of English. A telephone, Skype, or in-person interview may be required to verify this.</p> |
| <p>Learning Outcomes of the course</p> | <p>This course offers a professional-grade training program for 3D Asset Development, VR, Gaming industry and other Commercial projects.</p> <p>In this comprehensive training program, students will learn how to create 3D models, understand the pipeline for creating assets for a game engine, and discover state-of-the-art techniques to get your assets game& simulation ready. Also they learn how to work In TV Commercials, Game Houses and Work for Freelance market. Learn the latest tools & techniques for creating virtual landscapes, props, environments, Vehicles and other 3D meshes.</p> <p>Software's Students Will Learn Autodesk MAYA (For 3D Modeling, UV Unwrapping, Rigging, Skinning, Animation) Arnold (For Lighting ,Shading , Rendering) Make Human (For Base Character Mesh) Adobe Photoshop (For Texturing) Unreal Engine Beginner Guide (For Game Asset Testing)</p> |

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| Course Execution Plan | Total duration of course: 6 months (26 Weeks) Class hours: 4 hours per day Theory: 20% Practical: 80% Weekly hours: 20 hours per week Total contact hours: 520hours |
| Companies offering jobs in the respective trade | <ol style="list-style-type: none"> 1. Graphic Design Studios 2. Advertising and Marketing firms 3. Game Design Studios 4. Freelancing Websites 5. Book/magazine publishers 6. Interior/furniture design houses 7. Textile design studios 8. Independent creators 9. Youtube / instagram / TikTok content creators |
| Job Opportunities | <p>3D Animation, VR & SIMULATION, also known as Communication and Visual design is recognized across the world as the leader in visual content design. Graphic designers thus hold a high rate of employability in various capacities across various industries. As long as social media, visual and communication space, digital design and interaction landscape is alive and functioning, Designers will always have a pivotal role in how the digital and communication world appears to everyone. Following are some of the roles that are present and or may become available as trends shift and morph to the Graphic Designer:</p> <p>Animator Web designer Mobile app designer Video editor Illustrator Graphic Designer Game asset creator Logo creator Social media and marketing specialist</p> |
| No of Students | 25 |
| Learning Place | Computer Lab Equipped with Intel Corei7 machines with dedicated graphics card. |
| Instructional Resources | <p>In collaboration with NAVTCC will provide the free access of the curriculum, teaching aids, training & counseling for the trainers.</p> <p>https://helpx.adobe.com/photoshop/tutorials.html Photoshop tutorials https://en.wikipedia.org/wiki/Visual_design_elements_and_principles Blog (teacher resource) on Cultural Influences in Design - http://www.core77.com/posts/21455/Does-CultureMatter-for-Product-Design History of Graphic Design Website - http://www.designhistory.org/ History of Graphic Design Website - http://www.historygraphicdesign.com Blog on Cultural Influences in Graphic Design - http://boldthinkcreative.com/culturedesign/ UK Essays (How Graphic Design Affects Culture) -</p> |

<https://www.ukessays.com/essays/culturalstudies/how-graphicdesign-affects-culturecultural-studies-essay.php>

World Press.com (article) - <https://www.ukessays.com/essays/cultural-studies/how-graphic-design-affects-culture-cultural-studies-essay.php>

Best Examples of Typography Website -

<http://www.awwwards.com/websites/typography/>

Creative Blog – 18 Typography resources -

<http://www.creativeblog.com/typography/top-typographyresources-912816>

Photoshop Tutorials - <https://helpx.adobe.com/photoshop/tutorials.html>

PDF from Getty Center (Principles of Design) -

https://www.getty.edu/education/teachers/building_lessons/principles_design.pdf

PDF from Getty Center (Elements of Art) -

https://www.getty.edu/education/teachers/building_lessons/elements_art.pdf

Wordpress.com – Article on Designing Digital Magazines -

<http://www.adobepress.com/articles/article.asp?p=1987679>

Digital Layout resource - <http://design.tutsplus.com/articles/15-indesign-tutorials-for-magazine-and-layout-design--vector-5456>

Magazine Digest Creating Digital Design - <http://www.magazinedesigning.com/>

Trade Show resources - <http://tradeshowsresources.com/>

Trade show digest digital magazine - <http://www.tsnn.com/>

Ed Tech Digital Portfolio resource - <http://gettingsmart.com/2015/06/every-student-should-have-a-digital-portfolio/>

Digital Portfolio Best Practices resource -

<https://www.roberthalf.com/blog/writing-a-resume/3-digital-portfolio-best-practices-how-to-make-a-portfolio-that-pops>

Royalty Free Photos

www.pexels.com

Free Font Downloads

www.dafont.com

Free Photoshop Brushes and Patterns

www.brushking.eu

www.brusheezy.com

Free Vectors and Assets

www.freepik.com

[Social Media Sizing Guidelines](#)

[File Format Glossary](#)

MODULES

| Scheduled Weeks | Module Title | Learning Units | Remarks |
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| Week 1 | Fundamentals of Motion Graphics/ exploring Autodesk Maya, Photoshop | <p>Motivational Lecture(<i>For further detail please see Page No: 3& 4</i>)</p> <ul style="list-style-type: none"> • Course Introduction • Job market • Course Applications • Institute/work ethics <ul style="list-style-type: none"> • Introduction to 3d animation vr & simulation • About Autodesk maya • Getting started with maya user interface • Exercise building a basic 3d scene: 3D Modeling, Shapes, Lights and Tools. | <p style="text-align: center;">Task-1 Task-2 Task-3</p> <p style="text-align: center;"><i><u>Details may be seen at Annexure-I</u></i></p> |
| Week 2 | Autodesk Maya, Photoshop | <ul style="list-style-type: none"> • Success stories (<i>For further detail please see Page No: 3& 4</i>) • Overview of Adobe Photoshop software • Learn fundamentals of MATERIALS, SHADERS & TEXTURES <ul style="list-style-type: none"> • Materials define how a surface should be rendered, by including references to the Textures it uses, tiling information, Color tints and more. The available options for a Material depend on which Shader the Material is using. • Shaders are small scripts that contain the mathematical calculations and algorithms for calculating the Color of each pixel rendered, based on the lighting input and the Material configuration. | <p style="text-align: center;">Task-4</p> <p style="text-align: center;"><i><u>Details may be seen at Annexure-I</u></i></p> |

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| | | <ul style="list-style-type: none"> Textures are bitmap images. A Material can contain references to textures, so that the Material's Shader can use the textures while calculating the surface color of an object. Textures can represent many other aspects of a Material's surface such as its reflectivity or roughness. | |
| | Design & modeling | Learn fundamental tools and techniques for prop modeling in Autodesk Maya, and examine the process of how to create Module for a variety of applications. | |
| Week 3 | Autodesk Maya, Photoshop | <ul style="list-style-type: none"> Motivational Lecture(For further detail please see Page No: 3& 4) <p>Optimizing Geometry for Real Time</p> <p>This module takes student through the top issues, tools, and techniques they need to understand in their 3D application to make data transfer into a gaming engine smooth and easy and create more performant real-time applications.</p> <p>This section aims to provide clarity on how models should be optimally prepared in a 3D modeling program before they are used in Unreal Engine.</p> <p>By the end of this course, the student will have confidence in their ability to use 3D modeling tools to create optimized models for Unreal Engine projects</p> <ul style="list-style-type: none"> - Review of naming conventions - Defining 3D geometry requirements - Identifying common 3D model issues - Modeling assets with poly-count restrictions - UV mapping for gaming engine - Basics of material in gaming engine | <p>Task-5 Task-6</p> <p><u>Details may be seen at Annexure-1</u></p> |
| Week 4 | Autodesk Maya, Photoshop | <p>Success stories (For further detail please see Page No: 3& 4)</p> <p>ANIMATION OVERVIEW</p> <p>So, what is 3D? The term has become a bit muddled lately with the rise of stereoscopic movies, TV, and games that have been</p> | <p>Task-7</p> <p>1st Monthly Test</p> <p><u>Details may be</u></p> |

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| | | <p>termed “3D.” For our purpose, 3D will be the process of creating forms that exist digitally in three dimensions that can then be animated and rendered from any direction. But even in this more narrow definition, 3D can mean several things that have different goals and different technical benefits or limitations. We will generally lump them into two areas – high rez and low rez (short for high and low resolution).</p> <p>Workflow</p> <p>Regardless of whether someone is creating low- or high-rez animation, the term “animation workflow” is a bit deceptive. It tends to imply that there is a linear progression in the process of creating animation. In reality, animation of all types tends to be a cyclical process of creating assets, reviewing, recreating assets, reviewing, and refining assets, and so on. Perhaps the only two parts of the workflow that really do reliably happen in order is that the animation starts with a sketch and ends with rendering.</p> <p>However, describing that animation process as “just a bunch of things that happen” is fairly unfulfilling – and is pretty tough for the beginner to grasp. Further, it is true that very broadly speaking, some things do happen before others (a model must be created before its UVs can be laid out for instance). With this in mind, we can start to visualize how projects come together by linearly defining the process. However, as we work through these steps, keep in mind that it’s a very broadly painted image and that there will undoubtedly be some fluidity of order in the process.</p> <p>MODELINDG – UV LAYOUT – TEXTURE – RIGGING & SKINNING – ANIMATION – LIGHTING & RENDERING</p> | <p><u>seen at Annexure-1</u></p> |
| <p>Week 5</p> | <p>Autodesk Maya, Photoshop</p> | <ul style="list-style-type: none"> • Motivational Lecture (For further detail please see Page No: 3& 4) <p>Architectural modeling</p> <p>As is true with most all of 3D, there are several ways to accomplish a particular look or shape. In Maya, this is especially true.</p> | <p>Task-8</p> <p><u>Details may be seen at Annexure-1</u></p> |

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| | | <p>When you are looking at the mounds of research, you will have done before a project and are trying to plot out how to model a particular shape, there will actually be quite a few methods that will present themselves. Picking which is best for which situation is the key.</p> <p>In order to efficiently pick the best method, it's important to understand a bit about how 3D software works, and how we see what we see when looking at 3D forms.</p> | |
| Week 6 | Autodesk Maya, Photoshop | <ul style="list-style-type: none"> • Success stories (For further detail please see Page No: 3& 4) <p>Architectural modeling</p> <p>The Polygon</p> <p>The polygon is both the star, and the smallest of players – it is what all forms (that we see) are made of</p> | <p>Task-9</p> <p><u>Details may be seen at Annexure-I</u></p> |
| Week 7 | Autodesk Maya, Photoshop | <ul style="list-style-type: none"> • Motivational Lecture(For further detail please see Page No: 3& 4) <p>Architectural modeling</p> <p>Parts</p> <p>Polygons have several component parts (which we've referred to in the last chapter). These components are labeled.</p> | <p>Task-10</p> <p><u>Details may be seen at Annexure-I</u></p> |
| Week 8 | Autodesk Maya, Photoshop | <ul style="list-style-type: none"> • Success stories (For further detail please see Page No: 3& 4) <p>UVs & UV Layout</p> <p>So now we have our objects. The tools of polygons and NURBS have been explored, and engaging shapes have taken form. Now what?</p> <p>Well, the gray plastic shapes we have been creating must be getting kind of old to look at. I always get a bit depressed when I have spent too long in the modeling realm – I need color! And indeed, texturing the shapes created will start to really bring these forms out of the depressing realms of gray and into a colorful world of life.</p> | <p>Task-11</p> <p>2nd Monthly Test</p> <p><u>Details may be seen at Annexure-I</u></p> |

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| <p>Week 9</p> | <p>Autodesk Maya, Photoshop</p> | <ul style="list-style-type: none"> • Motivational Lecture (For further detail please see Page No: 3& 4) <p>UVs & UV Layout</p> <p>We were just slapping a simple color on the objects, we could do that now. However, these forms will have much more life if there is a texture that lies across the geometry. In our hallways, the floors should look like there is some tile or wood on them, the walls have peeling plaster, and the doors – rotting wood. Our little alien character needs to have some parts of his form look like green skin, and other parts appear to have clothing. To do this, we need to be able to manage what parts of a texture are applied to what parts of a polygon mesh.</p> | <p>Task-12</p> <p><u>Details may be seen at Annexure-I</u></p> |
| <p>Week 10</p> | <p>Autodesk Maya, Photoshop</p> | <ul style="list-style-type: none"> • Success stories (For further detail please see Page No: 3& 4) <p>Material creation & texture painting:</p> <p>In the last chapter, out of necessity, we took a quick look at creating a new material. There are a few ways to create and apply textures: In the Hypershade, a new material is creating by clicking one of the shader type buttons (Anisotropic, Blinn, Hair Tube Shader, Lambert, Layered Shader, etc.). When this is done, a new material will be created and show up in the Materials tab. This material can then be applied to an object by middle-mouse-dragging it from the Hypershade to the object in the View Panel, or by selecting an object (or objects) in the View Panel and then in the Hypershade right-clicking on the material and choosing Assign Material to Selection, or by right-clicking on an object in the View Panel and choosing Assign Existing Material > Name of Material from the Hotbox.</p> <p>Game Level and Architectural Texturing:</p> <p>We will start off by creating the textures for the room we UV mapped in the last chapter. There are fewer surfaces there and it will be easier to see the direct correlation between how the textures are built and their usage</p> | <p>Task-13</p> <p><u>Details may be seen at Annexure-I</u></p> |

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| | | <p>and placement in the space</p> <p>What is rendering? Rendering is the act of turning your 3D information into tangible images that can be shown on screen. Styles vary from photorealism to a more animated feel. Rendering has become a standard practice with the need for computer imagery on more and more productions. Though the process is complex, it's still something you can master with some guidance. UNDERSTANDING RENDERING</p> <p>Arnold Render Engine. A render engine is any additional software you use to generate a graphic output. Think of it as a translator. Whatever you create with Maya in the 3D space, Arnold turns into something that can be perceived as finalized images.</p> | |
| <p>Week 11</p> | <p>Autodesk Maya, MakeHuman, Marvelous Designer, Substance Painter</p> | <ul style="list-style-type: none"> • Motivational Lecture (<i>For further detail please see Page No: 3& 4</i>) <p>3D character development: For games and animation</p> <p>Before you animate the characters and objects in your scene, set up the scene by rigging all your characters and by applying the appropriate constraints and deformers to all the objects you want to animate. Rigging a character, also known as character setup, involves creating skeletons and IK handles for your characters, binding skins to the skeletons, and setting up deformers and constraints.</p> <ul style="list-style-type: none"> • Understanding the basics of rigging • Creating skeletons • Rigging characters | <p>Task-14</p> <p><u><i>Details may be seen at Annexure-I</i></u></p> |

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| | | <ul style="list-style-type: none"> Using Maya's new HumanIK skeletons/rigs Using Quick rig option Binding skin using Smooth Bind Painting and editing skin weights | |
| Week 12 | Autodesk Maya, MakeHuman, Marvelous Designer, Substance Painter | <p>Topics covered</p> <ul style="list-style-type: none"> Finalizing a rig Introduction to 3D Character Animation Animation Workflow using references Basic animations Character animation basics Retargeting | <p>Task-15</p> <p><i><u>Details may be seen at Annexure-I</u></i></p> |
| | Build your CV | <ul style="list-style-type: none"> Success stories (For further detail please see Page No: 3& 4) <p>Download professional CV template from any good site (https://www.coolfreecv.com or relevant)</p> <ul style="list-style-type: none"> Add Personal Information Add Educational details Add Experience/Portfolio Add contact details/profile links | |
| Week 13 | Autodesk Maya, MakeHuman, Marvelous Designer, Substance Painter, Unreal Engine | <ul style="list-style-type: none"> Motivational Lecture(For further detail please see Page No: 3& 4) <p>3D game development: VR & simulation</p> <p>Description: Unreal Engine is the world's most open and advanced real-time 3D creation tool. Continuously evolving to serve not only its original purpose as a state-of-the-art game engine, today it gives creators across industries the freedom and control to deliver cutting-edge content, interactive experiences, and immersive virtual worlds. Learn how to create and mod 3D games, VR & Simulations using Unreal Engine, even if you're a complete beginner. Unreal is a game development engine used by AAA studios and indie developers worldwide. It can be a complex beast to get into, but we</p> | <p>Task-16</p> <p>Mid-Term Exam</p> <p><i><u>Details may be seen at Annexure-I</u></i></p> |

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| | | <p>break it down step-by-step</p> <p>What you'll learn:</p> <ul style="list-style-type: none"> - Game design concepts. - Level designing - Unreal Engine Shaders | |
| Week 14 | Autodesk Maya, MakeHuman, Marvelous Designer, Substance Painter, Unreal Engine | <ul style="list-style-type: none"> • Success stories (For further detail please see Page No: 3& 4) <p>What you'll learn:</p> <ul style="list-style-type: none"> - Lighting In Unreal Engine - Visual Scripting (Blueprints) in Unreal Engine. - Compiling and Publishing Games for Various Platforms. | <p>Task-17</p> <p><u>Details may be seen at Annexure-I</u></p> |
| | Specialization | <p>3D Asset crafting for games:</p> <p>Leran to create optimised 3D assets for gaming, vr & simulation</p> | |
| Week 15 | Autodesk Maya, Arnold ,Unreal Engine | <ul style="list-style-type: none"> • Motivational Lecture(For further detail please see Page No: 3& 4) <p>Optimizing Geometry for Real Time This course explores how to optimally prepare models in a 3D modeling program before they are used in Unreal Engine. You'll learn the tools and techniques needed to make data transfer into the engine smooth and easy.</p> <p>Moving a 3D design into a real-time engine can feel like a daunting and time-consuming task.</p> <p>Many of the things that are quick, easy, and efficient in a modeling program can cause significant visual artifacts and runtime performance issues that are not straightforward to understand and correct.</p> <p>This course takes the artist through the top issues, tools, and techniques they need to understand in their 3D application to make data transfer into Unreal Engine smooth and easy and create more performant real-time applications.</p> <p>This course aims to provide clarity on how</p> | <p>Task-18</p> <p><u>Details may be seen at Annexure-I</u></p> |

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| | | <p>models should be optimally prepared in a 3D modeling program before they are used in Unreal Engine.</p> <p>By the end of this course, the student will have confidence in their ability to use 3D modeling tools to create optimized models for Unreal Engine projects</p> | |
| | Create an account profile on Fiverr (at least two gigs) and Upwork | <p>Create an account by following these steps: Step 1: Personal Info Step 2: Professional Info Step 3: Linked Accounts Step 4: Account Security</p> | |
| Week 16 | Autodesk Maya, Arnold, Unreal Engine | <ul style="list-style-type: none"> • Success stories (For further detail please see Page No: 3& 4) <p>Animation Workflow The term has become a bit muddled lately with the rise of stereoscopic movies, TV, and games that have been termed “3D.” For our purpose, 3D will be the process of creating forms that exist digitally in three dimensions that can then be animated and rendered from any direction. But even in this more narrow definition, 3D can mean several things that have different goals and different technical benefits or limitations. We will generally lump them into two areas – high rez and low rez (short for high and low resolution).</p> | <p>Task-19</p> <p>3rd Monthly Test</p> <p><u>Details may be seen at Annexure-1</u></p> |
| Week 17 | Autodesk Maya, Arnold, Unreal Engine | <ul style="list-style-type: none"> • Motivational Lecture(For further detail please see Page No: 3& 4) <p>Maya Philosophy Maya is currently owned by the behemoth of the 3D world – Autodesk. They have owned Maya since 2005, and few 3D software have as deep a market penetration or as wide a name recognition. At a recent presentation that I gave at the Los Alamos National Laboratory, there were two pieces of 3D software that this group of nuclear scientists had heard of, Blender (a free open-source competitor) and Maya. None of the other 3D competitors were even on their radar.</p> | <p>Task-20</p> <p><u>Details may be seen at Annexure-1</u></p> |
| Week 18 | Autodesk Maya, Arnold, Unreal Engine | <ul style="list-style-type: none"> • Success stories (For further detail please see Page No: 3& 4) | Task-21 |

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| | | <p>Architectural & Gaming Asset Development (Optimize Asset)</p> <p>there are several ways to accomplish a particular look or shape. In Maya, this is especially true. When you are looking at the mounds of research, you will have done before a project and are trying to plot out how to model a particular shape, there will actually be quite a few methods that will present themselves. Picking which is best for which situation is the key. In order to efficiently pick the best method, it's important to understand a bit about how 3D software works, and how we see what we see when looking at 3D forms</p> | <p><u>Details may be seen at Annexure-I</u></p> |
| Week 19 | Autodesk Maya, Arnold, Unreal Engine | <ul style="list-style-type: none"> • Motivational Lecture (For further detail please see Page No: 3& 4) <p>UVs & UV Layout for Architecture and Level Design</p> <p>The tools of polygons and NURBS have been explored, and engaging shapes have taken form. Now what? Well, the gray plastic shapes we have been creating must be getting kind of old to look at. I always get a bit depressed when I have spent too long in the modeling realm – I need color! And indeed, texturing the shapes created will start to really bring these forms out of the depressing realms of gray and into a colorful world of life.</p> | <p>Task-22</p> <p><u>Details may be seen at Annexure-I</u></p> |
| Week 20 | Autodesk Maya, Arnold, Unreal Engine | <ul style="list-style-type: none"> • Success stories (For further detail please see Page No: 3& 4) <p>Material Creation And Texture Painting</p> <p>Gray plastic is getting really old. So far we've created some great looking forms and taken some extensive time to do the hard work of good UV layouts. Now we get to reap the benefits of that hard work and start texturing our surfaces to bring some real life to the scenes</p> | <p>Task-23</p> <p>4th Monthly Test</p> <p><u>Details may be seen at Annexure-I</u></p> |
| | Live Project | In this final phase of training, students will | |

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| | | <p>apply the acquired skill set on Live projects. They will be part of a live production team in a live environment</p> | |
| Week 21 | Autodesk Maya, Arnold, Unreal Engine | <ul style="list-style-type: none"> • Motivational Lecture (For further detail please see Page No: 3& 4) <p>Projection Decision and criteria selection</p> <ul style="list-style-type: none"> • Each student base on their personal \technical skill set acquired in earlier module will select and discuss the project • Work/list on the key requirements and guideline for the selected project | <p>Task-24</p> <p><u>Details may be seen at Annexure-I</u></p> |
| Week 22 | Autodesk Maya, Arnold , Unreal Engine | <ul style="list-style-type: none"> • Success stories (For further detail please see Page No: 3& 4) <p>Planning and exhibition face</p> <ul style="list-style-type: none"> • Student needs to create a comprehensive workflow process • Milestone and delivery schedule will be created | <p>Task-25</p> <p>Job Searching</p> <p><u>Details may be seen at Annexure-I</u></p> |
| | How to search and apply for jobs in at least two labor marketplace countries (KSA, UAE, etc.) | <ul style="list-style-type: none"> • Browse the following website and create an account on each website <ul style="list-style-type: none"> ▪ Bayt.com – The Middle East Leading Job Site ▪ Monster Gulf – The International Job Portal ▪ Gulf Talent – Jobs in Dubai and the Middle East • Find the handy ‘search’ option at the top of your homepage to search for the jobs that best suit your skills. • Select the job type from the first ‘Job Type’ drop-down menu, next, select the location from the second drop-down menu. • Enter any keywords you want to use to find suitable job vacancies. • On the results page you can search for part-time jobs only, full-time jobs only, employers only, or agencies only. Tick the boxes as appropriate to your search. | |

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| | | <ul style="list-style-type: none"> • Search for jobs by: <ul style="list-style-type: none"> ▪ Company ▪ Category ▪ Location ▪ All jobs ▪ Agency • Industry | |
| Week 23 | Autodesk Maya, Arnold , Unreal Engine | <ul style="list-style-type: none"> • Motivational Lecture (For further detail please see Page No: 3& 4) <p>Live Development(Basic)</p> <ul style="list-style-type: none"> • In this week student creating integral and measure assets need for the projects | Task-26 <u>Details may be seen at Annexure-I</u> |
| Week 24 | Autodesk Maya, Arnold , Unreal Engine | <ul style="list-style-type: none"> • Success stories (For further detail please see Page No: 3& 4) <ul style="list-style-type: none"> • Live Development (Advance) • All the Assets created for the final preview this assets will be tested for unreal engine and Maya Arnold | Task-27 <u>Details may be seen at Annexure-I</u> |
| Week 25 | Autodesk Maya, Arnold , Unreal Engine | <ul style="list-style-type: none"> • Motivational Lecture(For further detail please see Page No: 3& 4) <p>Testing and Prototyping</p> <ul style="list-style-type: none"> • Base on the components created on earlier module assets will be tweaked and errors will be removed accordingly • Assets will be checked and verified for optimization | Task-28 <u>Details may be seen at Annexure-I</u> |
| WEEK 26 | Autodesk Maya, Arnold , Unreal Engine | <ul style="list-style-type: none"> • Success stories (For further detail please see Page No: 3& 4) <p>Final Delivery And Packaging</p> <ul style="list-style-type: none"> • Freelance option will be discuss • Job placement opportunities | Task-29 Final Exam <u>Details may be seen at Annexure-I</u> |

Annexure-I:

Tasks For Certificate in 3D Animation VR & Simulation

| Task No. | Task | Description | Week |
|----------|---|--|--------|
| 1. | Concept of 3D World | Create and Assign Geographic Coordinate Systems in Autodesk | Week 1 |
| 2. | Concept of Lighting & Texturing | Apply color and shading to an object in Autodesk/Adobe Photoshop etc | |
| 3. | Concept of Rendering | Search the Rendering software's and make comparison | |
| 4. | Overview of software | Students will create in Maya a cube/box, DICE. IN Photoshop they will create the number texture images for all six sides; they will then create a material in Maya & apply the texture. | Week-2 |
| 5. | Learn fundamental techniques for prop modeling | Create Prop using 3D software | Week 3 |
| 6. | Learn fundamental tools for prop modeling | Create > Polygon Primitives Modeling Toolkit Mesh Tools > Create Polygon Tool Create a polygon mesh Create, edit, or position an image plane | |
| 7. | Animation overview | Animate objects to move along a three-dimensional track through your scene. Use the following link https://knowledge.autodesk.com/support/maya/learn-explore/caas/CloudHelp/cloudhelp/2020/ENU/Maya-Animation/files/GUID-341D458E-7324-4538-A736-72DD9A58542E-htm.html | Week 4 |

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| 8. | Architectural modeling (overview) | Create your first target shape using the following site. https://www.creativebloq.com/how-to/blend-shape-creation-maya | Week 5 |
| 9. | Architectural modeling (overview) | create the entire main form of the head from the first rows of polygons. Use the following website. http://tomcapizzi.com/tutorials/mayaMastersWeb/mayaMastersWeb.html | Week 6 |
| 10. | Architectural modeling (overview) | Apply Splitting Polygons on the shape . Use the following website. http://tomcapizzi.com/tutorials/mayaMastersWeb/mayaMastersWeb.html | Week 7 |
| 11. | UVs & UV Layout | Select and Unfold UVs in Maya's UV Texture Editor Use the following site https://knowledge.autodesk.com/support/maya/learn-explore/caas/video/youtube/watch-v-tVocOSQ8WC0.html?st=UV | Week 8 |
| 12. | UV Layout | Apply UV Projection Mapping in Maya https://knowledge.autodesk.com/support/maya/learn-explore/caas/video/youtube/watch-v-IFxvtePms8c.html?st=UV | Week 9 |
| 13. | Material creation & texture painting | Using Maya's Hypershade Material Editor create model https://knowledge.autodesk.com/support/maya/learn-explore/caas/video/youtube/watch-v-Rlmkf9sVzel.html?st=hypershade | Week 10 |
| 14. | 3D character development: For games and animation | Setup a character by using the following lab https://knowledge.autodesk.com/support/maya/learn-explore/caas/video/youtube/watch-v-c538zkwxgTQ.html?st=create%20Character%20games | Week 11 |
| 15. | 3D character | Animate the character in Maya | Week 12 |

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| | development: For games and animation | https://knowledge.autodesk.com/support/maya/learn-explore/caas/simplecontent/content/maya-animation-animate-character-cycle-maya-2018-part-1.html?st=create%20Character%20games | |
| 16. | 3D game development: | create the animation cycle for a game character in Maya https://knowledge.autodesk.com/support/maya/learn-explore/caas/simplecontent/content/maya-animation-animate-character-cycle-maya-part-2.html?st=create%20Character%20games | Week 13 |
| 17. | Unreal engine overview | Apply lighting in unreal engine | Week 14 |
| 18. | Optimizing Geometry for Real Time | Create and optimize geometry in Unreal engine | Week 15 |
| 19. | Animation Workflow | Create the character in maya and apply animation work flow | Week 16 |
| 20. | Maya Philosophy | Make presentation of 3D softwares and how maya is leading the world | Week 17 |
| 21. | Architectural & Gaming Asset Development (Optimize Asset) | Create Game Assest in Maya https://www.pinterest.com/pin/29977153755479464/ | Week 18 |
| 22. | UVs & UV Layout for Architecture and Level Design | Create UV Characters in Maya | Week 19 |
| 23. | Material Creation And Texture Painting | Prepare your model for the 3D Paint Tool in Maya | Week 20 |
| 24. | Projection Decision | Create A project on the game development in Maya. | Week 21 |
| 25. | Planning and exhibition face | Make documentation on the project. | Week 22 |
| 26. | Live Development(Basic) | In this week student creating integral and measure assets need for the projects | Week 23 |
| 27. | Live Development (Advance) | Assets created for the final preview | Week 24 |

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| 28. | Testing and Prototyping | Assets will be checked and verified for optimization | Week 25 |
| 29. | Final Delivery And Packaging | Job placement opportunities | Week 26 |

Annexure-II:

3DAnimation VR & Simulation

Step by step chapter 1 link

<https://drive.google.com/file/d/1exux26dN7VqUnz0P1vJOM06FPs3a85mp/view?usp=sharing>

Step by step chapter 2 link

<https://drive.google.com/file/d/1ydRevOYtA2tRkrNT4dcF1jXQGn7acGJ2/view?usp=sharing>

Step by step chapter 3 link

<https://drive.google.com/file/d/1QPOe78otoMPI2juNZYuEdBhUvT8d6-kJ/view?usp=sharing>

Step by step chapter 4 link

https://drive.google.com/file/d/1P9g47oG9fTeVEjAd_sFoAvhRVo2u32nL/view?usp=sharing

Step by step chapter 5 link

<https://drive.google.com/file/d/1gXUSzK0pQChEkypby2sRkBjLPmuu0vCK/view?usp=sharing>

Annexure-II

SUGGESTIVE FORMAT AND SEQUENCE ORDER OF MOTIVATIONAL LECTURE.

Mentor

Mentors are provided an observation checklist form to evaluate and share their observational feedback on how students within each team engage and collaborate in a learning environment. The checklist is provided at two different points: Once towards the end of the course. The checklists are an opportunity for mentors to share their unique perspective on group dynamics based on various team activities, gameplay sessions, pitch preparation, and other sessions, giving insights on the nature of communication and teamwork taking place and how both learning outcomes and the student experience can be improved in the future.

Session- 1 (Communication):

Please find below an overview of the activities taking place Session plan that will support your delivery and an overview of this session's activity.

| |
|---|
| Session- 1 OVERVIEW |
| Aims and Objectives: |
| <ul style="list-style-type: none"> To introduce the communication skills and how it will work Get to know mentor and team - build rapport and develop a strong sense of a team Provide an introduction to communication skills Team to collaborate on an activity sheet developing their communication, teamwork, and problem-solving Gain an understanding of participants' own communication skills rating at the start of the program |

| Activity: | Participant Time | Teacher Time | Mentor Time |
|---|---|--------------|--|
| Intro Attend and contribute to the scheduled. | | | |
| Understand good communication skills and how it works. | | | |
| Understand what good communication skills mean | | | |
| Understand what skills are important for good communication skills | | | |
| Key learning outcomes: | Resources: | | Enterprise skills developed: |
| <ul style="list-style-type: none"> Understand the communication skills and how it works. | <ul style="list-style-type: none"> Podium Projector Computer Flip Chart | | <ul style="list-style-type: none"> Communication Self Confidence Teamwork |

| | | |
|--|--|--|
| <ul style="list-style-type: none"> • Understand what communication skills mean • Understand what skills are important for communication skills | <ul style="list-style-type: none"> • Marker | |
|--|--|--|

| Schedule | Mentor Should do |
|--|--|
| Welcome: 5 min | Short welcome and ask the Mentor to introduce him/herself. Provide a brief welcome to the qualification for the class. Note for Instructor: Throughout this session, please monitor the session to ensure nothing inappropriate is being happened. |
| Icebreaker: 10 min | Start your session by delivering an icebreaker, this will enable you and your team to start to build rapport and create a team presentation for the tasks ahead. The icebreaker below should work well at introductions and encouraging communication, but feel free to use others if you think they are more appropriate. It is important to encourage young people to get to know each other and build strong team links during the first hour; this will help to increase their motivation and communication throughout the sessions. |
| Introduction & On boarding: 20mins | Provide a brief introduction of the qualification to the class and play the “Onboarding Video or Presentation”. In your introduction cover the following: <ol style="list-style-type: none"> 1. Explanation of the program and structure. (Kamyab jawan Program) 2. How you will use your communication skills in your professional life. 3. Key contacts and key information – e.g. role of teacher, mentor, and SEED. Policies and procedures (user agreements and “contact us” section). Everyone to go to the Group Rules tab at the top of their screen, read out the rules, and ask everyone to verbally agree. Ensure that the consequences are clear for using the platform outside of hours. (9am-8pm) 4. What is up next for the next 2 weeks ahead so young people know what to expect (see pages 5-7 for an overview of the challenge). Allow young people to ask any questions about the session topic. |
| Team Activity Planning: 30 minutes | MENTOR: Explain to the whole team that you will now be planning how to collaborate for the first and second collaborative Team Activities that will take place outside of the session. There will not be another session until the next session so this step is required because communicating and making decisions outside of a session requires a different strategy that must be agreed upon so that everyone knows what they are doing for this activity and how. |

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| | <ul style="list-style-type: none"> • “IDENTIFY ENTREPRENEURS” TEAM ACTIVITY • “BRAINSTORMING SOCIAL PROBLEMS” TEAM ACTIVITY” <p><i>As a team, collaborate on a creative brainstorm on social problems in your community. Vote on the areas you feel most passionate about as a team, then write down what change you would like to see happen.</i></p> <p>Make sure the teams have the opportunity to talk about how they want to work as a team through the activities e.g. when they want to complete the activities, how to communicate, the role of the project manager, etc. Make sure you allocate each young person a specific week that they are the project manager for the weekly activities and make a note of this. Type up notes for their strategy if this is helpful - it can be included underneath the Team Contract.</p> |
| <p>Session Close: 5 minutes</p> | <p>MENTOR: Close the session with the opportunity for anyone to ask any remaining questions.</p> <p>Instructor: Facilitate the wrap-up of the session. A quick reminder of what is coming up next and when the next session will be.</p> |

MOTIVATIONAL LECTURES LINKS.

| <u>TOPIC</u> | <u>SPEAKER</u> | <u>LINK</u> |
|--|---|---|
| How to Face Problems In Life | Qasim Ali Shah | https://www.youtube.com/watch?v=OrQte08MI90 |
| Just Control Your Emotions | Qasim Ali Shah | https://www.youtube.com/watch?v=JzFs_yJt-w |
| How to Communicate Effectively | Qasim Ali Shah | https://www.youtube.com/watch?v=PhHAQEGehKc |
| Your ATTITUDE is Everything | Tony Robbins Les Brown David Goggins Jocko Willink Wayne Dyer Eckart Tolle | https://www.youtube.com/watch?v=5fS3rj6eIFg |
| Control Your EMOTIONS | Jim Rohn Les Brown TD Jakes Tony Robbins | https://www.youtube.com/watch?v=chn86sH005U |
| Defeat Fear, Build Confidence | Shaykh Atif Ahmed | https://www.youtube.com/watch?v=s10dzfbozd4 |
| Wisdom of the Eagle | Learn Kurooji | https://www.youtube.com/watch?v=bEU7V5rJTtw |
| The Power of ATTITUDE | Titan Man | https://www.youtube.com/watch?v=r8LJ5X2eigU |
| STOP WASTING TIME | Arnold Schwarzenegger | https://www.youtube.com/watch?v=kzSBrJmXqdg |
| Beginners Guide to Learning 3D Computer Graphics | Blender Guru | https://www.youtube.com/watch?v=VT5oZndzj68&ab_channel=BlenderGuru |
| Risk of Success | Denzel Washington | https://www.youtube.com/watch?v=tbnzAVRZ9Xc |

SUCCESS STORY

| S. No | Key Information | Detail/Description |
|-------|--|---|
| 1. | Self & Family background | <p>Zain ul Abidin, who lives in Lahoe, is an example of how hard work and perseverance can reap rich rewards when bidding for projects online.</p> <p>The 3D Animation developers works exclusively on an online freelancing platform and has earned, on average, US\$25,000 per month for the past several months. But this isn't a story of overnight success – Zain ul abdin has had to work hard to differentiate himself and stay true to his goal.</p> <p>It was a full year later, in May 2016, when Zain ul abdin finally decided to jump in. He signed up for one of the numerous sites that connect 3D developer with people or companies that have small projects, like 3d animation of product or projects.</p> <p>He had already started a small business to help pay for his college education, so he was nervous and apprehensive about the decision. “I gave myself two or three months at most. If I didn't succeed, then I would go back to running the business as it was showing potential,” he says.</p> <p>If at first, you don't succeed, try try again</p> |
| 2. | How he came on board NAVTTC Training/ or got trained through any other source | Certification in graphic designing from STEPS(NAVTTC partner institute) |
| 3. | Post-training activities | <p>Zain ul Abidin's area of expertise is in 3D animation. In his first month using Fiverr, he pitched mostly for projects. But it wasn't so simple. In the first few weeks, he didn't hear back from even a single client, despite pitching for dozens of projects.</p> <p>“I needed to understand what worked, so I read blogs, participated in forums, and analyzed profiles of successful freelancers. It was an uphill struggle, but I didn't want to give up,” he explains.</p> <p>Zain ul abdin says he understands why clients would be apprehensive giving projects to untested freelancers. They</p> |

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| | | <p>have hundreds of options to choose from, he explains, and to give a project to someone with no experience requires a strong leap of faith.</p> <p>A slow stream of projects started to come Zain ul abdin's way. Within a few months, he was landing an average of a hundred projects every month, with a large number of repeat clients.</p> |
| 4. | <p>Message to others (under training)</p> | <p>Take the training opportunity seriously Impose self-discipline and ensure regularity Make Hard work pays in the end so be always ready for the same.</p> |

Note: Success story is a source of motivation for the trainees and can be presented in several ways/forms in a NAVTTC skill development course as under: -

1. To call a passed out successful trainee of the institute. He will narrate his success story to the trainees in his own words and meet trainees as well.
2. To see and listen to a recorded video/clip (5 to 7 minutes) showing a successful trainee Audio-video recording that has to cover the above-mentioned points.*
3. The teacher displays the picture of a successful trainee (name, trade, institute, organization, job, earning, etc) and narrates his/her story in the teacher's own motivational words.

The online success stories of renowned professional can also be obtained from **Annex-II*

Workplace/Institute Ethics Guide

Work ethic is a standard of conduct and values for job performance. The modern definition of what constitutes good work ethics often varies. Different businesses have different expectations. Work ethic is a belief that hard work and diligence have a moral benefit and an inherent ability, virtue, or value to strengthen character and individual abilities. It is a set of values-centered on the importance of work and manifested by determination or desire to work hard.

The following ten work ethics are defined as essential for student success:

1. Attendance:

Be at work every day possible, plan your absences don't abuse leave time. Be punctual every day.

2. Character:

Honesty is the single most important factor having a direct bearing on the final success of an individual, corporation, or product. Complete assigned tasks correctly and promptly. Look to improve your skills.

3. Team Work:

The ability to get along with others including those you doesn't necessarily like. The ability to carry your weight and help others who are struggling. Recognize when to speak up with an idea and when to compromise by blend ideas together.

4. Appearance:

Dress for success set your best foot forward, personal hygiene, good manner, remember that the first impression of who you are can last a lifetime

5. Attitude:

Listen to suggestions and be positive, accept responsibility. If you make a mistake, admit it. Values workplace safety rules and precautions for personal and co-worker safety. Avoids unnecessary risks. Willing to learn new processes, systems, and procedures in light of changing responsibilities.

6. Productivity:

Do the work correctly, quality and timelines are prized. Get along with fellows, cooperation is the key to productivity. Help out whenever asked, do extra without being asked. Take pride in your work, do things the best you know-how. Eagerly focuses energy on accomplishing tasks, also referred to as demonstrating ownership. Takes pride in work.

7. Organizational Skills:

Make an effort to improve, learn ways to better yourself. Time management; utilize time and resources to get the most out of both. Take an appropriate approach to social interactions at work. Maintains focus on work responsibilities.

8. Communication:

Written communication, being able to correctly write reports and memos.
Verbal communications, being able to communicate one on one or to a group.

9. Cooperation:

Follow institute rules and regulations, learn and follow expectations. Get along with fellows, cooperation is the key to productivity. Able to welcome and adapt to changing work situations and the application of new or different skills.

10. Respect:

Work hard, work to the best of your ability. Carry out orders, do what's asked the first time. Show respect, accept, and acknowledge an individual's talents and knowledge. Respects diversity in the workplace, including showing due respect for different perspectives, opinions, and suggestions.