Shri Vaishnav Vidhyapeeth Vishwavidhyalaya, Indore

Shri Vaishnav Institute of Architecture

B. Des in Graphics and Animation

BDNGA601 – 3D Game Design - II

COURSE CODE	COURSE NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		L	T	S	CREDITS
		END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BDNGA601	3D Game Design - II				100	100			5	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):-

CEO 1	To understand the definition and principles of Game Design.
CEO 2	This course is intended to provide skills for Game Design.

Course Outcomes (COs)

CO1	To understand the Production pipeline of Game Design
CO2	To develop the skill & understand the process of Game Design
CO3	To make students understand the process of Production of 3D Game Design

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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BDNGA601	3D Game Design - II				100	100			5	5

Course Contents/Syllabus

1. **Unit I**
   Introduction & Overview of Game Engine, Discussion about different types of Game Engine available in market, Game Engine pipeline & Workflow.

2. **Unit II**
   Cleanup & Preparing Models and Assets for exporting, exploring export setting, Concept of Texture & Light Baking. Working with Game Export tool.

3. **Unit III**
   Exploring User Interface of Game Engine (Unreal), Customize user interface, working with viewport navigation tools, Creating first project inside game engine, Exploring project setting properties, Importing Assets & Models, Working with transform tools.

4. **Unit IV**
   Mesh Types, Inputs, Collisions, Working with material, Exploring Lighting Techniques inside game engine, Simulations,

5. **Unit V**
   Animating Character & Object, Visual Elements, Camera Animation, working with blue prints, Variables, Array, Function, Real time Composting, Cinematic & Sequencer.

Reference Books

1. **Joanna Lee –** Learning Unreal Engine Game Development
2. **The Art of Game Design** by Jesse Schell is commonly
3. **A Theory of Fun** for Game Design by Raph Koster
4. **Fundamentals of Game Design** by Ernest Adams

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BDNGA602 – **Unreal Engine**

COURSE CODE	COURSE NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		L	T	S	CREDITS
		END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BDNGA602	Unreal Engine				100	100			5	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):-

CEO 1	This course designed to provide you with a comprehensive understanding of the Unreal Engine.
CEO 2	To help the students to create universes and games beyond their wildest imagination.

Course Outcomes (COs)

CO1	To develop understanding of Game design production pipeline.
CO2	Demonstrate proficiency in scene management & level design.
CO3	To develop understanding about 3D modeling, texturing, lighting principles, and rendering in game engines.

Course Contents/Syllabus

Unit-I

Introduction to Unreal Engine, Getting started with Unreal Engine, Register and installation, user interface, creating first project inside unreal engine, Viewport navigation & customization,

Unit-II

Level of tools, working with Actors, Select Mode, Snapping, Content Browser, Details Panel, Static Mashes, Brushes, Modeling inside unreal engine.

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BDNGA602	**Unreal Engine**				100	100			5	**5**

Unit-III

Working with Actors in unreal engine – Component, Volume, Player Start, Lights & Materials etc., Basic of Landscapes, Landscape from Height Map, Different types of Lights, Material Techniques.

Unit-IV

Working with scanned geometries, Creating Forest Landscape, Game Environment, Architectural Lighting (Exterior, Interior), Working with Quixel & Megascane Models, Particles Effects in Unreal Engine.

Unit-V

Rigging in Unreal Engine, Working with Metahuman Mocap, Animating Character & Object, Visual Elements, Camera Animation, working with blue prints, Variables, Array, Function, Real time Composting, Cinematic & Sequencer, Game Exporting APK.

Reference Books :-

1. **Joanna Lee –** Learning Unreal Engine Game Development
2. **Jesse Schell** - The Art of Game Design
3. **Jason Busby**, **Zak Parrish**, **Joel Van Eenwyk –** Mastering Unreal Technology : The Art of Level Design
4. **Joanna Lee**, **John P. Doran**, **Nitish Misra –** Unreal Engine: Game Development from A to Z

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BDNGA603 – Advanced Modeling

COURSE CODE	COURSE NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		L	T	S	CREDITS
		END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BDNGA603	**Advanced Modeling**				100	100			4	**4**

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs) :-

CEO 1	To make student understand the process & workflow of Modeling for production.
CEO 2	To develop the understanding of the complexities of Modeling design process for Character & Environmental Modeling.

Course Outcomes (COs)

CO1	To develop understanding of the human anatomy for Character Modeling.
CO2	To create creative concept and visualize the same for effective 3D Set Design.
CO3	To make students understand the process & technique of Production level 3D Modeling & Sculpting workflow.

Course Contents/Syllabus

Unit-I

Getting started advanced modeling in Maya, Modeling gaming assets, weapons (Sci-Fi Gun, Conceptualize Sword), Environmental assets, and Character props modeling (Shoes, Backpack, Accessories etc.)

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BDNGA603	**Advanced Modeling**				100	100			4	**4**

Unit-II

Getting started character modeling for games in Maya, Understanding body anatomy for character modeling, Character torso modeling, Hand Modeling, Foot Modeling,

Unit-III

Understanding facial anatomy of character, Started Face modeling in Maya, Cloth modeling for character, Conceptualized Spaceship Modeling, Detailed Environment modeling.

Unit-IV

Getting started with advanced UV unwrapping in Maya, UV unwrapping & texturing of gaming assets, texturing gaming weapon, UV unwrapping & texturing of Character model, Generating different UV maps for models.

Unit-V

Getting started with Z-Brush, Concept of digital sculpting, Exploring user interface, Viewport navigation and transform tools, Exploring different sculpting tool in Z-Brush, Sculpting gaming assets, Character sculpting and Re-Topology, Generating Displacement & Normal Map, 3D texturing in Z-Brush.

Reference Books:-

1. **3D Modeling for Beginners**: Learn Everything You Need to Know about 3D Modeling!
2. **Autodesk Maya 2023 Basics Guide**: Kelly L. Murdock
3. **ZBrush Digital Sculpting Human Anatomy -** Scott Spencer
4. **ZBrush Character Creation: Advanced Digital Sculpting -** Scott Spencer
5. **Digital Modeling:** William Vaughan

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BDNGA604 – **Advanced Dynamics**

COURSE CODE	COURSE NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		L	T	S	CREDITS
		END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BDNGA604	Advanced Dynamics					100			4	**4**

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Course Educational Objectives (CEOs):-

CEO 1	To introduce process and techniques of 3D Dynamics.
CEO 2	This course is intended to provide skills for Character Fx.

Course Outcomes (COs)

CO1	To develop understanding of the concept & process of Dynamics.
CO2	To make students understand about Particle simulation.
CO3	Students will understand the skills & techniques about Cloth Simulation, Hair & Fur Simulation for Character Dynamics.

Course Contents/Syllabus

Unit I

Introduction & Overview of Dynamics in Maya, Definition of Dynamics, Types & Use of Dynamics in Films, TV Commercial & Games. Introduction to Particles in Maya, Working with Legacy particle.

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BDNGA604	Advanced Dynamics					100			4	**4**

Unit II

Particle sketch tool, Creating Galaxy Effect by using particle sketch tool, Working with Particle Emitter and its types, Creating Fireworks Effect by using Particle Emitter tool, Object Based Emitter, Particle Instancer, Fire Effect, Crow simulation etc.

Unit III

Working with N-Particles, Emitter and its types, Object Based Emitter, Creating Fluid Effect by using N-Particles, Object dispersion effect, Working with Rigid Body and Soft Body, Working with Fields (Air, Gravity, Turbulence, Newton, Radial etc.)

Unit IV

Introduction to N-Cloth in Maya, Creating Simple Table Cloth, Creating Animated Flag, Window Curtains, Create Car Crashing Effect by using N-Cloth, Creating Destruction Effect, Character Cloth, Balloon Animation, Pillow Effect,

Unit V

Introduction & overview of Fluid Effect in Maya, Working with 2D & 3D Container, Creating Simple Candle Flame, Creating Fire Effect, Smoke Effect, Meteor Effect, Nuclear Explosion, Introduction to Ocean & Pond, Exploring Bifrost Fluids, Getting started with Hair & Fur in Maya, Exploring N-Hair, Hair Styling, Working with X-Gen system,

REFERENCE BOOKS:

1. **Abhishek Kumar –** Begging VFX with Autodesk Maya
2. **Lee Lanier –** Creating Visual Effects in Maya : Fire, Water, Debris, and Destruction
3. **Eric Keller –** Maya Visual Effects: The innovator's
4. **David Schoneveld , Alex Alvarez** - Maya Fluid Effects : Fundamentals

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BDNGA 605 – Compositing III

	COURSE NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		L	T	S	CREDITS
		END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BDNGA605	Compositing III				100	100			4	**4**

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;

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Course Educational Objectives (CEOs):-

CEO 1	To introduce the process of Node-Based Compositing
CEO 2	This course is intended to provide skills and techniques for Composting in Nuke.

Course Outcomes (COs)

CO1	To develop ability to create complex composites, integrating multiple elements, such as live-action, CGI, and matte paintings.
CO2	To develop ability to enhance and stylize footage, ensuring final outputs meet industry standards.
CO3	To provide skills to seamlessly combine 3D elements with live-action footage.

Course Contents/Syllabus

Unit I

Introduction & overview of Vfx Industry, Vfx pipeline for production, Getting Started with Foundry Nuke, Understanding User Interface, Project Setting, Preference Panel, Viewport navigation & tools, Exploring Viewer, Property and Node Graph Panel.

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	COURSE NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		L	T	S	CREDITS
		END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BDNGA605	Compositing III				100	100			4	4

Unit II

Working with Node Graph Panel, Importing Footage, Basic Super Imposing, Read Node, Merge Node, Transform Node, Working with Roto Node, Roto out Car, Roto poly workflow, Character rotoscopy, Working with Roto Paint Node, Basci Clean up.

Unit III

Introduction to Tracking & Matchmoving, Working with Tracker Node, Facial tracking mark cleanup, Working with Planner Tracker Node, Signboard Cleanup, Patches and Marks Removal, Working with Camera Tracker Node, Concept of 3D Tracking, Camera Projection workflow, Tracking with 3d Equalizer, Track and solve complex camera shots, Multi camera projection workflow.

Unit IV

Concept of Chroma workflow(Green & Blue Screen), Working with Chroma Removal Nodes (Keyer, Keylight, Primatte, UltraKey etc.), Working with Semitransparent chroma shots, Working with Erode Node, Concept of Color correction and grading, Render Passes Compositing.

Unit V

Creating Particle Effect inside Nuke, CG & Live integration, Compositing CG Elements with Live Footage, Advanced Color Grading and Color Correction Techniques, Working with EXR File Formats, Write Node & Exporting file from Nuke,

REFERENCE BOOKS -

1. **Lee Lanier** - Digital compositing with Nuke
2. **Ron Brinkmann -** The Art of Digital Compositing
3. **Nuke Codex –** Node Within Nodes
4. **Steve Wright** – Digital Compositing for Film & Video
5. **Ron Ganbar** - Nuke 101: Professional Compositing & Visual Effects

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