Specialization Path 04 – Game Design & Development (12 Weeks)

Program Objective

To develop industry-ready skills in game design, development, and deployment, enabling learners to conceptualize, build, and deliver interactive gameplay experiences across platforms.

Week 01 – Introduction to Game Development Pipeline

Topics Covered:

- Overview of game development lifecycle
- Roles in game production (design, art, programming)
- Game engines and tools overview
- Types of games (2D, 3D, mobile, PC, XR)
- Project setup and version control basics

Learning Outcome:

- Understand the complete game development pipeline
- Identify key roles and workflows in game production
- Set up a structured game development project

Week 02 – Game Design Fundamentals

Topics Covered:

- Core game design principles
- Mechanics, dynamics, and aesthetics (MDA framework)
- Player psychology and engagement
- Game loops and progression systems
- Balancing and difficulty design

Learning Outcome:

- Design engaging gameplay systems
- Apply core design principles to game concepts
- Structure player progression and game loops effectively

Week 03 – Level Design Basics

Topics Covered:

- Principles of level design
- Player flow and navigation
- Spatial storytelling

- Whiteboxing and prototyping
- Introduction to level design tools

Learning Outcome:

- Create functional and engaging level layouts
- Design intuitive player navigation paths
- Build basic level prototypes

Week 04 – 2D & 3D Asset Integration

Topics Covered:

- Asset types (characters, props, environments, UI)
- Importing 2D and 3D assets into game engines
- Asset pipelines and formats
- Materials, textures, and shaders basics
- Scene organization

Learning Outcome:

- Integrate 2D and 3D assets into game environments
- Organize assets efficiently within a project
- Ensure assets are optimized for performance

Week 05 – Introduction to Scripting for Games

Topics Covered:

- Basics of scripting (logic, variables, conditions)
- Event-driven programming
- Player controls and input systems
- Object interaction scripting
- Debugging basics

Learning Outcome:

- Write basic scripts to control gameplay elements
- Implement player movement and interactions
- Debug simple scripting issues

Week 06 – Intermediate Scripting & Gameplay Systems

Topics Covered:

- Game mechanics implementation (health, scoring, AI basics)

- State machines and behavior logic

- UI interaction scripting

- Save/load systems basics

- Code optimization practices

Learning Outcome:

- Build core gameplay systems using scripting

- Structure logic for scalable game mechanics

- Optimize scripts for better performance

Week 07 – Advanced Level Designing

Topics Covered:

- Advanced level workflows

- Environmental storytelling techniques

- Interactive level elements

- Multi-level design and progression

- Player experience refinement

Learning Outcome:

- Design complex and engaging levels

- Integrate gameplay mechanics within level design

- Enhance player experience through environment design

Week 08 – Physics in Games

Topics Covered:

- Physics engines and components

- Collision detection and rigid bodies

- Gravity, forces, and motion

- Physics-based interactions

- Optimization of physics systems

Learning Outcome:

- Implement realistic physics interactions

- Apply forces and collisions in gameplay

- Optimize physics systems for smooth performance

Week 09 – Game Testing & Debugging

Topics Covered:

- Types of testing (functional, usability, performance)

- Debugging workflows

- Bug tracking and reporting

- Playtesting methodologies

- Iteration and refinement

Learning Outcome:

- Test and debug gameplay effectively

- Identify and fix issues systematically

- Improve game quality through iterative testing

Week 10 – Gameplay Development & Polish

Topics Covered:

- Refining game mechanics

- Feedback systems (audio, visual cues)

- UI/UX improvements in games

- Game feel and responsiveness

- Balancing gameplay

Learning Outcome:

- Enhance gameplay experience and polish

- Implement feedback systems for better engagement

- Balance mechanics for improved playability

Week 11 – Build Creation & Deployment

Topics Covered:

- Build settings and configurations

- Platform-specific optimization (PC, mobile, web)

- Packaging and exporting games

- Version control and release management

- Basic publishing workflows

Learning Outcome:

- Generate playable builds for different platforms

- Optimize games for deployment

- Prepare projects for publishing

Week 12 – Final Game Project & Presentation

Topics Covered:

- Final game development (end-to-end project)
- Integration of design, assets, scripting, and gameplay
- Testing and final polish
- Portfolio and presentation
- Industry standards and review

Learning Outcome:

- Develop a complete playable game
- Present a polished and functional game project
- Build a portfolio-ready game aligned with industry expectations

Final Deliverables

- Game Design Document (GDD)
- Level Design Prototypes
- Scripted Gameplay Systems
- Playable Game Levels
- Tested & Debugged Game Build
- **Final Playable Game (Capstone Project)**