

REVISED UG SYLLABUS UNDER CBCS
(Implemented from Academic Year 2020-21)

PROGRAMME: FOUR YEAR B.Sc. (Hons)

Domain Subject: **B. Sc Animation**

Skill Enhancement Courses (SECs) for Semester V, from 2022-23 (Syllabus/Curriculum)

Pair Options of SECs for Semester–V

(To choose one pair from the five alternate pairs of SECs)

Univ. Code	Courses 6&7	Name ofCourse	Th.Hrs / Week	IE Mar-ks	EE Mar-ks	Credits	Prac. Hrs./ Wk	Mar-ks	Credits
	6A	2D Design	3	25	75	3	3	50	2
	7A	2D Game	3	25	75	3	3	50	2

OR

	6B	3D iClone	3	25	75	3	3	50	2
	7B	3D Blender	3	25	75	3	3	50	2

OR

	6C	Game Level Design	3	25	75	3	3	50	2
	7C	Game Programming and coding	3	25	75	3	3	50	2

Note-1:

For Semester- V, for the domain subject Animation, anyone of the three pairs of SECs shall be chosen as courses 6 and7 ,i.e., 6A&7A or 6B&7B or 6C&7C.The pairs hall not be broken (ABC allotment is random, not on any priority basis).

Note-2:

One of the main objectives of Skill Enhancement Courses(SEC) is to inculcate field skills related to the domain subject in students. The syllabus of SEC will be partially skill oriented. Hence, teachers shall also impart practical training to students on the field skills embedded in the syllabus citing related real field situations.

Semester-wise Revised Syllabus under CBCS, 2020-21
Four Year B.Sc. (Hons) - Semester – V (from 2022-23)

Subject: **B.Sc Animation**

Course-6A: **2D Design**

(Skill Enhancement Course (Elective), 5 credits, Max Marks: 100 + 50)

Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the need, scope, and concepts in 2D animation
2. Identify various facilities required to set up a character and object animation
3. Comprehend various factors to create 2D objects
4. Learn skills related to choosing and drawing a background and foreground designing

Syllabus: *(Total Hours: 90 including Teaching, Lab, Field Training and unit tests, etc.)*

Unit - I: Introduction to 2D Animation Software, Project Creation, Creating Scenes in software, About Saving, About Server, User Interface, Menus, Toolbars, Workspaces, Documentation

Unit - II: Layers and Columns, Layers, Cloning Layers, About Groups, Drawing, About Brush tool, Brush presets, Creating a pencil, About Shape tools, Stamp Tools, Eraser Tool, Drawing Space, Isometric Perspective

Unit - III: Painting and Colors, Color swatches, Palettes, Painting, Dirt Cleanup, Gradient and texture, Paperless Animation, Rough Animation, Tools, Onionskin, About art layers, Scene Staging, Layer Position, Animation Tools, Multiplane

Unit - IV: Digital Animation, Pegs, Keyframes, Controls, Functions, Velocity, Morphing Animation, Creating Morphing, Hints, Morphing quality, Importing & Scanning, Multi-layers PSD, About FLA, PSD Layouts

Unit - V: Camera Set-up and Animation, Character Rigging, Tig Types, Models, Character Breakdown, Z Nudging, Cut-out Animation, Deformations, Effects, Sound, Rendering & Exporting, Library & Templates

References:

1. Harmony20 Advanced - toon boom harmony 20 advanced user guide 2021
2. Harmony17 Premium - Getting Started Guide, 2020
3. *Web resources suggested by the Teacher concerned and the college Librarian including reading material*

Co-Curricular Activities:**a) Mandatory:** (*Training of students by the teacher in field related skills*)

1. Seminar/Workshop on related topics
2. RVJ(Reflective Visual Journal) on the theory and particles
3. Production/ Live related 2D project
4. Industry trip

b) Suggested Co-Curricular Activities:

1. Training of students by a related field expert
2. Group discussions, Quiz, Debates, etc
3. Preparation of videos and PPT for the subject related presentations
4. Collection of material on the topics
5. Invited lectures and presentations on related topics

2D Design Lab

1. Tracing the Character
2. Bouncing Ball
3. Morphing
4. Camera Animation
5. Lip Sync for given dialogue
6. Add Light and Tone for the environment
7. Create a 2D animation story within 30sec

MODELQUESTIONPAPER(Sem-end.Exam)

B.Sc DEGREE EXAMINATION

SEMESTER –V

Course 6A: 2D Design(Skill Enhancement Course- Elective)

Time:3Hrs

Max.marks:75

Section – A

Answer any 5 Questions. Each Question Carries 5 marks

5 X 5 = 25

1. Explain the project creation
2. Explain the User Interface of the 2D software
3. What is the server? Explain in detail
4. Explain the keyboard shortcuts
5. Write in detail about tools
6. What are view and workspace
7. How to add effects in the project
8. Explain the character breakdown

Section – B

Answer all the questions. Each question carries 10 marks

5 X 10 = 50

9. a) How to select the character for a 2D short film
(or)
b) What is Stand-Alone mode? Explain in detail
10. a) Explain the database in the server
(or)
b) What about the Flat and customizing tools
- 11 a) What is clone layers?
(or)
b) What is Annotation files? Explain in details
- 12 a) Explain the Brus tools and tips
(or)
b) Write about the texture and dual tip
- 13 a) Explain the pencil and textures
(or)
b) What is the Stamp tool and explain the creating process

Semester-wise Revised Syllabus under CBCS, 2020-21

Four Year B.Sc. (Hons) - Semester – V (from 2022-23)

Subject: **B.Sc Animation**

Course-7A:2D Game

(Skill Enhancement Course (Elective), 5 credits, Max Marks: 100 + 50)

Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the need, scope, and concepts in 2D Game
2. Identify various facilities required to set up a character and object animation
3. Comprehend various factors to create 2D objects
4. Learn skills related to choosing and drawing a background and foreground designing

Syllabus: (Total Hours: 90 including Teaching, Lab, Field Training and unit tests, etc.)

Unit - I: Introduction to the 2D game, History of Physical game, History of computer games, Commercial 2D games, Game engines, Future of games

Unit - II: Development of game, Functionality provided by a game engine, Console programming, Game Physics, Collision Detection, and resolution, Deformable bodies

Unit - III: Gaming in harmony, Game asset creation, Game rigging guidelines, Game cutter, Game animation tips, Animating multiple sequences, Separate scenes, Separating using scene markers

Unit - IV: Exporting to unity, Setting anchors and props, Exporting sprite, Exporting Easel JS, Working in Unity, Unity interface, About game objects, Props to anchors in Unity, Working with audio in Unity

Unit - V: Scripting guide, Creating scripts, Script packaged with Harmony, Script Syntax, External script editor, Storing scripts in a custom directory

References:

1. Harmony20 Advanced - toon boom harmony 20 advanced user guide 2021
2. Harmony17 Premium - Getting Started Guide, 2020
3. Advanced Game Development with Programmable Graphics Hardware, Alan Watt and Fabio Policarpo, A K Peters.
4. Game Programming Gems 1-6, Mark DeLoura, Charles River Media.
5. AI Game Programming Wisdom 1-3, Steve Rabin, Charles River Media.

Web resources suggested by the Teacher concerned and the college Librarian including reading material

Co-Curricular Activities:

1. Seminar/Workshop on related topics
2. RVJ(Reflective Visual Journal) on the theory and particles
3. Production/ Live related Game
4. Industry trip

Suggested Co-Curricular Activities:

1. Training of students by a related field expert
2. Group discussions, Quiz, Debates, etc
3. Preparation of videos and PPT for the subject related presentations
4. Collection of material on the topics
5. Invited lectures and presentations on related topics

2D Game Lab:

1. 2D Game character design
2. 2D Game assets
3. 2D Game level design
4. Playable game with user interface
5. Upload in the play store

MODELQUESTIONPAPER(Sem-end.Exam)

B. Sc DEGREE EXAMINATION

SEMESTER –V

Course 7A: 2D Game(Skill Enhancement Course- Elective)

Time:3Hrs

Max.marks:75

Section – A

Answer any 5 Questions. Each Question Carries 5 marks

5 X 5 = 25

1. What is a 2D game? Explain in detail
2. History of game design
3. Explain the game engines
4. What are assets for game
5. Explain the tools and techniques
6. Explain the script versions
7. Explain the script syntax
8. How to write story to script

Section – B

Answer all the questions. Each question carries 10 marks

5 X 10 = 50

9. a) Discuss the physical game and computer game in detail
(or)
b) Write about the game engines in detail
10. a) Explain the game physics
(or)
b) Explain in detail Collision Detection, and resolution
11. a) Explain the game harmony
(or)
b) Write about Game animation tips
12. a) Explain the process of how to export harmony to unity
(or)
b) Write about the unity interface
13. a) What is an external script editor
(or)
b) What are scripting languages? Explain in detail

Semester-wise Revised Syllabus under CBCS, 2020-21
Four Year B.Sc. (Hons) - Semester – V (from 2022-23)

Subject: **B.Sc Animation**

Course-6B:**3D iClone**

(Skill Enhancement Course (Elective), 5 credits, Max Marks: 100 + 50)

Learning Outcomes

1. Students at the successful completion of the course will be able to:
2. Understand the need, scope, and concepts in 3D Animation
3. Identify various facilities required to set up a 3D character model and animation
4. Comprehend various factors to create 3D objects
5. Learn skills related to choosing and drawing a background and foreground designing

Syllabus: (Total Hours: 90 including Teaching, Lab, Field Training and unit tests, etc.)

Unit - I: Introduction to iClone, Main Menu, Environment, Camera Toolbar, Physics Toolbar, Timeline panel, Scene manager, PDR Environment setup, Time, 2D Background section, Snap to grid, Texture and editor

Unit - II: 3D Real-time Viewer, Render options, Drag and Drop, Image and Video, Audio, System Requirements, Video memory usage, Visual Enhancements, Performance Notes, Loading files, Real-time rendering

Unit - III: Material and Texture, Lights and Shadows, Opacity, Creating Animation, Removing all animation, Body proportions, Applying Cloth, Show or hide Inner Meshes, RL Head, Crazy talk8, Environmental Settings, Clone Cloth, Gloves and Shoes, Actor,

Unit - IV: CloneBone, Creating ahead, Creating a Face, Photo enhancement, Facial Features, Full head morph, Motion puppet panel, Exaggeration and Speed, Puppeteering Principles for Body puppet panel, Multilayer recording, Puppet to Timeline Clip

Unit - V: IK and FK, Toolbars for morph creator, Physics characters, Rigid Body, Soft Cloth, Dynamic, Kinematic, Creating moto with hinge, Moving and Rotating Spring effect, Rendering

References:

Web resources suggested by the Teacher concerned and the college Librarian including reading material

Co-Curricular Activities:

1. Seminar/Workshop on related topics
2. RVJ(Reflective Visual Journal) on the theory and particles
3. Production/ Live projects
4. Industry trip
5. Online training with industry experts

Suggested Co-Curricular Activities:

1. Training of students by a related field expert
2. Group discussions, Quiz, Debates, etc
3. Preparation of videos and PPT for the subject related presentations
4. Collection of material on the topics
5. Invited lectures and presentations on related topics

3D iClone Lab:

1. Modeling - Human Character
2. Texturing and Lighting any one Internal / External set
3. 360 degree light setup any character
4. Multi-pass render
5. Rigg the character

MODELQUESTIONPAPER(Sem-end. Exam)

**B. Sc DEGREE EXAMINATION
SEMESTER –V**

Course 6B: 3D iClone(Skill Enhancement Course- Elective)

Time:3Hrs

Max.marks:75

Section - A

Answer any 5 Questions. Each Question Carries 5 marks

5 X 5 = 25

1. Explain the interface of iClone?
2. What is the camera? Explain in detail
3. Explain toolbar? In detail
4. What is the visual environment? Explain in detail
5. What is clone bone setup the file
6. Explain in detail about the puppet tool
7. What is timeline
8. How to create a 3D model explains the process

Section – B

Answer all the questions. Each question carries 10 marks

5 X 10 = 50

9. a) Explain the texture and texture editor windows? In details
(or)
b) How to create 2D Background? Explain the process
10. a) what is 3D real-time viewer explain the methods
(or)
b) Explain the system requirements and explain the process how to install software
11. a) Explain the process to apply the cloth on the character
(or)
b) Explain the process to apply the gloves and shoes
12. a) How to create a face? Explain the process
(or)
b) what is a puppet tool? Explain the use
13. a) What are IK and FK explain in detail
(or)
b) Explain the soft bodies and rigid bodies in detail

Semester-wise Revised Syllabus under CBCS, 2020-21
Four Year B.Sc. (Hons) - Semester – V (from 2022-23)

Subject: **B.Sc Animation**

Course-7B:**3D Blender**

(Skill Enhancement Course (Elective), 5 credits, Max Marks:100 + 50)

Learning Outcomes

Students at the successful completion of the course will be able to:

1. Understand the process and methods of 3D creation and Softwares
2. Identify various facilities required to set up a 3D character model and animation
3. Comprehend various factors to create 3D objects
4. Learn skills related to demonstrating the 3D works

Syllabus: *(Total Hours: 90 including Teaching, Lab, Field Training and unit tests, etc.)*

Unit - I: Introduction to software, The screen setup, the user preferences window, Working with viewports, Moving around in 3D space, window and button control, creating viewports, working with basic meshes, using the main modifier to manipulate meshes, edit mode- mesh editing, the tool shelf, proportional editing, joining/ separating meshes, boolean operations,

Unit - II: Blender Render Engines, The classic rendering engine, The cycles render engine, Tweaking cycles for speed & quality, Materials and Textures, Basic material settings, Basic texture settings, Using images and movies as textures, Displacement mapping, Materials and Textures in cycles,

Unit - III: Setting up a world, Using color, mist and textures, Using an image in the background, Cycles world settings, Lighting and Cameras, Camera settings and options, Using nodes for depth-of-field, Green screen (chroma key), and more, Lighting types and settings, Indirect lighting, Basic setup options, Rendering movies and images, network rendering,

Unit - IV: Lighting and shadows, Reflection (mirror) and refraction (transparency), Animation Basics, Basic key-framing and auto key-framing, Working with the graph editor and dope sheet, Animating mates, lamps and world settings.

Unit - V: Adding 3D text, Blender 3d text settings, Converting to a mesh, NURBS and Meta shape basic, Using NURBS to create lofted shapes, Liquid and droplet effects using meta shapes, Modifiers, Basic mesh modifiers, simulation modifiers

References:

1. Blender Basics Classroom Tutorial Book, fifth edition by James Chronister
2. Blender Basics Classroom Tutorial book, fourth edition by James Chronister
Web resources suggested by the Teacher concerned and the college Librarian including reading material

Co-Curricular Activities:

1. Seminar/Workshop on related topics
2. RVJ(Reflective Visual Journal) on the theory and particles
3. Production/ Live projects
4. Industry trip
5. Online training with industry experts

Suggested Co-Curricular Activities:

6. Training of students by a related field expert
7. Group discussions, Quiz, Debates, etc
8. Preparation of videos and PPT for the subject related presentations
9. Collection of material on the topics
10. Invited lectures and presentations on related topics

3D Blender Lab:

1. Create a Bike model
2. Create a basic Robo model
3. Create a Landscape Light hose model
4. Apply texture and material for the light hose model
5. Apply ray trace on any character
6. Create and animate any company logo

MODELQUESTIONPAPER(Sem-end.Exam)

B. Sc DEGREE EXAMINATION

SEMESTER –V

Course 7B: 3D Blender(Skill Enhancement Course- Elective)

Time:3Hrs

Max.marks:75

Section – A

Answer any 5 Questions. Each Question Carries 5 marks

5 X 5 = 25

1. Explain the user interface? In detail
2. What are Animation and basic concepts
3. Explain the screen and types
4. What is packing data
5. Explain in detail about button control
6. How to create viewports explain in detail
7. Briefly explain the material
8. What is displacement Mappin

Answer all the questions. Each question carries 10 marks

5 X 10 = 50

9. a) Briefly explain the key commands

(or)

b) Write about the user preference window

10. a) What is 3D space and moving around

(or)

b) Explain the button control in detail

11.a) What are Halo settings explain the process

(or)

b) Explain the materials and textures

12. a) Explain the shelf tools in details

(or)

b) What is mages and movies as textures explain the process

13. a) Explain the setting up a world

(or)

b) Write about the color, starts and mist

c)

Semester-wise Revised Syllabus under CBCS, 2020-21

Four Year B.Sc. (Hons) - Semester – V (from 2022-23)

Subject: **B.Sc Animation**

Course-6C:**Game Level Design**

(Skill Enhancement Course (Elective), 5 credits, Max Marks:100 + 50)

Learning Outcomes

Students at the successful completion of the course will be able to:

1. Understand the process and methods of Game design
2. Identify various facilities required to create a game level in the different divisors
3. Comprehend various factors to create levels
4. Learn skills related to demonstrating and exposing the game on different platforms

Syllabus: (Total Hours: 90 including Teaching, Lab, Field Training and unit tests, etc.)

Unit - I: Introducing Unreal Engine, Understanding the Gameplay Framework, Coordinates, Transforms, Units, and Organization, working with Static Mesh Actors,

Unit - II: Applying Lighting and Rendering, Using Materials, using Audio System Elements, Creating Landscapes and Foliage, World Building, Crafting Effects with Particle Systems, Using Skeletal Mesh Actors,

Unit - III: Matinee and Cinematics, Learning to work with Physics, Introducing blueprint visual scripting system, Working with Level blueprints, Working with blueprint classes, Using Editable variables and the construction script,

Unit - IV: Making key input events and spawning actors, Making an action encounter, Creating an arcade shooter, Input systems and pawns

Unit - V: Obstacles and Pickups, Working with UMG, Making an executable, Working with mobile, Using touch, Using a device motion data, Advanced packaging settings

References:

1. Unreal Engine 4 game development, Aram Cookson, Ryan DowlingSoka, Clinton Crumpler
2. Unreal Engine 4 game development essentials

References Links

<https://www.raywenderlich.com/771-unreal-engine-4-tutorial-for-beginners-getting-started>

<https://docs.unrealengine.com/4.27/en-US/>

Web resources suggested by the Teacher concerned and the college Librarian including reading material

Co-Curricular Activities:

1. Seminar/Workshop on related topics
2. RVJ(Reflective Visual Journal) on the theory and particles
3. Production/ Live projects
4. Industry trip
5. Online training with industry experts

Suggested Co-Curricular Activities:

1. Training of students by a related field expert
2. Group discussions, Quiz, Debates, etc
3. Preparation of videos and PPT for the subject related presentations
4. Collection of material on the topics
5. Invited lectures and presentations on related topics

Game Level Design Lab:

1. Create a game model with the logo
2. Apply the texture and light of the created character
3. Create a one-level game with the playable mode
4. Create motion graphics using unreal
5. Show the work nodes

MODELQUESTIONPAPER(Sem-end.Exam)

**B. Sc DEGREE EXAMINATION
SEMESTER –V**

Course 6C: Game Level Design(Skill Enhancement Course- Elective)

Time:3Hrs

Max.marks:75

Section - A

Answer any 5 Questions. Each Question Carries 5 marks

5 X 5 = 25

1. How to create a project explain the process
2. What is modes and visualizers
3. How to create units and measurements
4. Explain the process of collision hulls
5. What is lighting explained in detail
6. Explain the physically based rendering(PBR)
7. What is Audio and explain the basics of audio adjustments
8. How to add sound in-game

Section - B

Answer all the questions. Each question carries 10 marks

5 X 10 = 50

9. a) Explain the process to build the character
(or)
b) How to matinee actors and editor

10. a) Explain the Physical Materials? In details
(or)
b) What is Blueprint editor? In detail

11. a) Explain the concepts in scripting
(or)
b) What are Blueprint classes? Explain the interface

12. a) What is a script and explain the uploading script
(or)
b) Explain the project setup for a game mode

13. a) How to create pawn and player controller
(or)
b) How to clean up old obstacles

Semester-wise Revised Syllabus under CBCS, 2020-21
Four Year B.Sc. (Hons) - Semester – V (from 2022-23)

Subject: **B.Sc Animation**

Course-7C:**Game Programming and Coding**

(Skill Enhancement Course (Elective), 5 credits, Max Marks: 100 + 50)

Learning Outcomes

Students at the successful completion of the course will be able to:

1. Understand the process and methods of Game Programming
2. Identify various facilities required to upload your game in the play station/ play store
3. Comprehend various factors to develop a game
4. Learn skills related to demonstrating and exposing the game on different platforms
5. Compose 2D and 3D dynamic worlds enhanced with special effects including sounds, and evaluate game performance in those world

Syllabus: (Total Hours: 90 including Teaching, Lab, Field Training and unit tests, etc.)

Unit - I: What is game programming really like, the Gamers, The hard work, The Dark side, What is a Game, Game Logic, Game view for the human player, Game Views for AI Agents, Use DirectX

Unit - II: Coding Tidbits and Style that saved me, Smart Code design practice, Smart Pointers and Naked pointers, Memory correctly, Grab Bag of useful stuff, Building your game, Creating a project, Multiplatform projects

Unit - III: Game Initialization and shutdown, Game code App, Game Actors and component Architecture, Creating actors and components, Data Sharing, Direct Access, Controlling the Main Loop, A Hybrid technique, Loading and Caching game data

Unit - IV: Programming Input Devices, User interface programming, Screen Elements, Game event management, Scripting with Lua, C/C++ scripting Language, Python, comments, Lua Development and Debugging

Unit - V: Game Audio, Sound Processes, Some Random Notes, 3D Graphics basics, 3D Graphics Pipeline, 3D vertex and pixel shaders, 3D scenes, Collision and simple physics, An introduction to Game AI, Network programming for Multiplayer Games, Introduction to multiprogramming, Game of teapot wars, Debugging and profiling your game, Driving to the finish

References:

1. Game coding complete fourth edition, Mike McShaffry
2. Ibahari, J. &Albahari, B. (2017). C# 7.0 in a Nutshell: The Definitive Reference (7th edition). Sebastopol, CA: O'Reilly, ISBN: 978-1491987650

References Links

- <https://docs.unity3d.com/Manual/index.html>
- Steering behavior for characters: <http://red3d.com/cwr/steer>
- Gamasutra: news, ideas: <http://www.gamasutra.com>
- Research in games: <http://game.itu.dk/index.php/About>
- Research in games: <http://game.itu.dk/index.php/About>
- Unity game engine: <https://unity3d.com/>
- Cry game engine: <http://cryengine.com/>

Web resources suggested by the Teacher concerned and the college Librarian including reading material

Co-Curricular Activities:

1. Seminar/Workshop on related topics
2. RVJ(Reflective Visual Journal) on the theory and particles
3. Production/ Live projects
4. Industry trip
5. Online training with industry experts
6. Exhibit the project

Suggested Co-Curricular Activities:

1. Training of students by a related field expert
2. Group discussions, Quiz, Debates, etc
3. Preparation of videos and PPT for the subject related presentations
4. Collection of material on the topics
5. Invited lectures and presentations on related topics
6. Design the own sound using different instrumental

Game Programming and Coding Lab:

1. Design and Develop a complete one level game
2. Gaming components in a programming platform
3. Upload game in the play store or play station

MODELQUESTIONPAPER(Sem-end.Exam)

**B. Sc DEGREE EXAMINATION
SEMESTER –V
Course 7C: Game Programming and Coding
(Skill Enhancement Course- Elective)**

Time:3Hrs

Max.marks:75

Section - A

Answer any 5 Questions. Each Question Carries 5 marks

5 X 5 = 25

1. Explain the Hardware and platforms of the game programming
2. What are file systems and resource caching
3. Explain the game logic and game state
4. Explain the interface classes of the programming language
5. What is C++'s shared
6. What is normal and milestone
7. Explain the system resources
8. How to check the memory using a script

Section - B

Answer all the questions. Each question carries 10 marks

5 X 10 = 50

9. a) What are virtual memory and optimizing memory access
(or)
b) Explain the Grab bag of useful stuff
10. a) How to build your game? Explain in detail
(or)
b) What is little motivation and configurations
11. a) Explain the game actors and component architecture
(or)
b) How to define actors components and create components
12. a) How to cache game data and loading data
(or)
b) Explain the resource cache and cache prediction
13. a) Explain in detail about scripting with Lua
(or)
b) Explain the scripting languages in details.