Your Dreams Our Goal

POORNIMA UNIVERSITY

Member of Association of Indian Universities & Approved by UGC (Govt. of India) under 2(f) & 12(B)

FACULTY OF DESIGN AND ARTS

DEPARTMENT OF VISUAL ARTS AND ANIMATION

SCHEME & SYLLABUS BOOKLET

BATCH 2023

BSC IN GAME DESIGN & AR-VR

SCHEME & SYLLABUS

BATCH: 2023-26

INDEX

Disclaimer: The scheme, syllabus and other materials published in this booklet may be changed or modified as per the requirement after approval of competent authority. The decision taken by the management of Poornima University will be final and abiding to all.

Student Details

Name of Student:

Name of Program:

Semester: Year: Batch:

Faculty of:

Your Dreams Our Goal

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VISION

To create knowledge based society with scientific temper, team spirit and dignity of labor to face global competitive challenges.

Mission

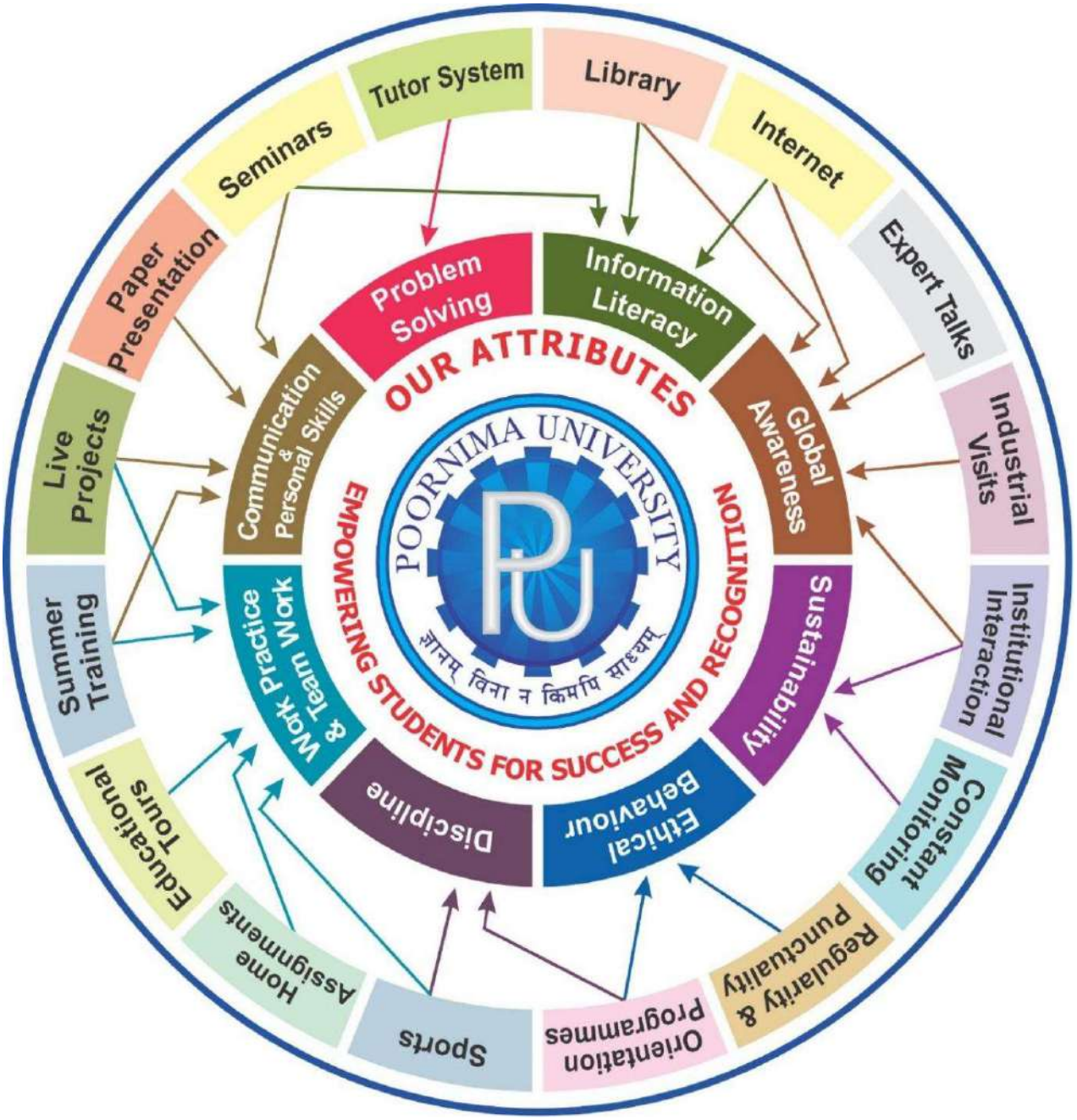
To evolve and develop skill based systems for effective delivery of knowledge so as to equip young professionals with dedication and commitment to excellence in all spheres of life.

Quality Policy

To provide Quality Education through Faculty development, updating of facilities and continual improvement meeting University norms and keeping stake holders satisfied.

Knowledge Wheel

At Poornima, the academic atmosphere is a rare blend of modern technical as well as soft skills and traditional systems of learning processes.



About Program and Program Outcomes (PO):

Title of the Programme: B.Sc. In Game Design AR & VR: Batch: 2023 – 26

Nature of the Programme: Bsc.in Game design & AR-VR is a three year full-time programme.

Program Outcomes (PO):

Game Design AR &VR Graduates will be able to:

1. Problem analysis: Identify, formulate, research literature, and analyses complex design problems reaching substantiated Conclusions using elements and principles of design.

2. Communication: Communicate effectively on complex design activities with the design community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

3. Design knowledge: Apply the knowledge of design fundamentals, and a specialization to the solution of complex design problems.

4. Design/development of solutions: Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. Project management and finance: Demonstrate knowledge and understanding of the design and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

7. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

8. The Designer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional design practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

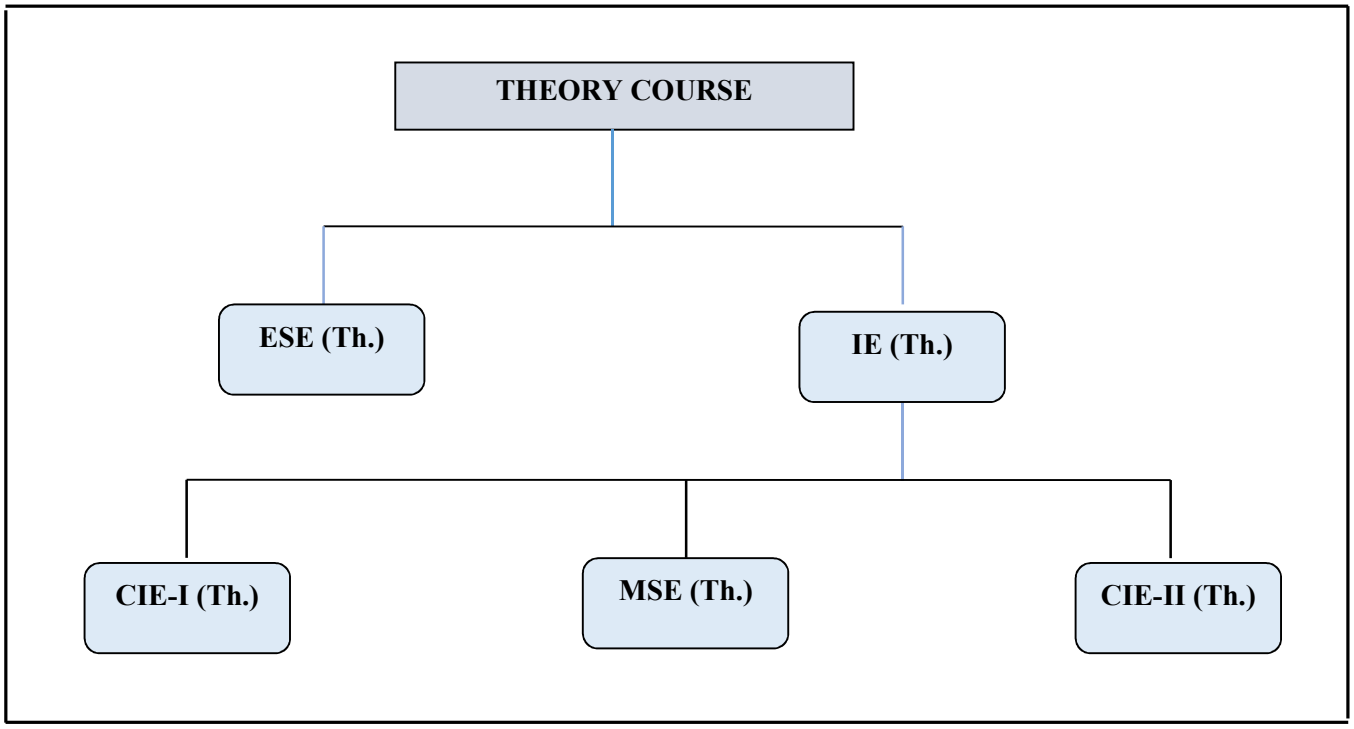
10. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the designing practice.

11. Environment and sustainability: Understand the impact of the professional designing solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

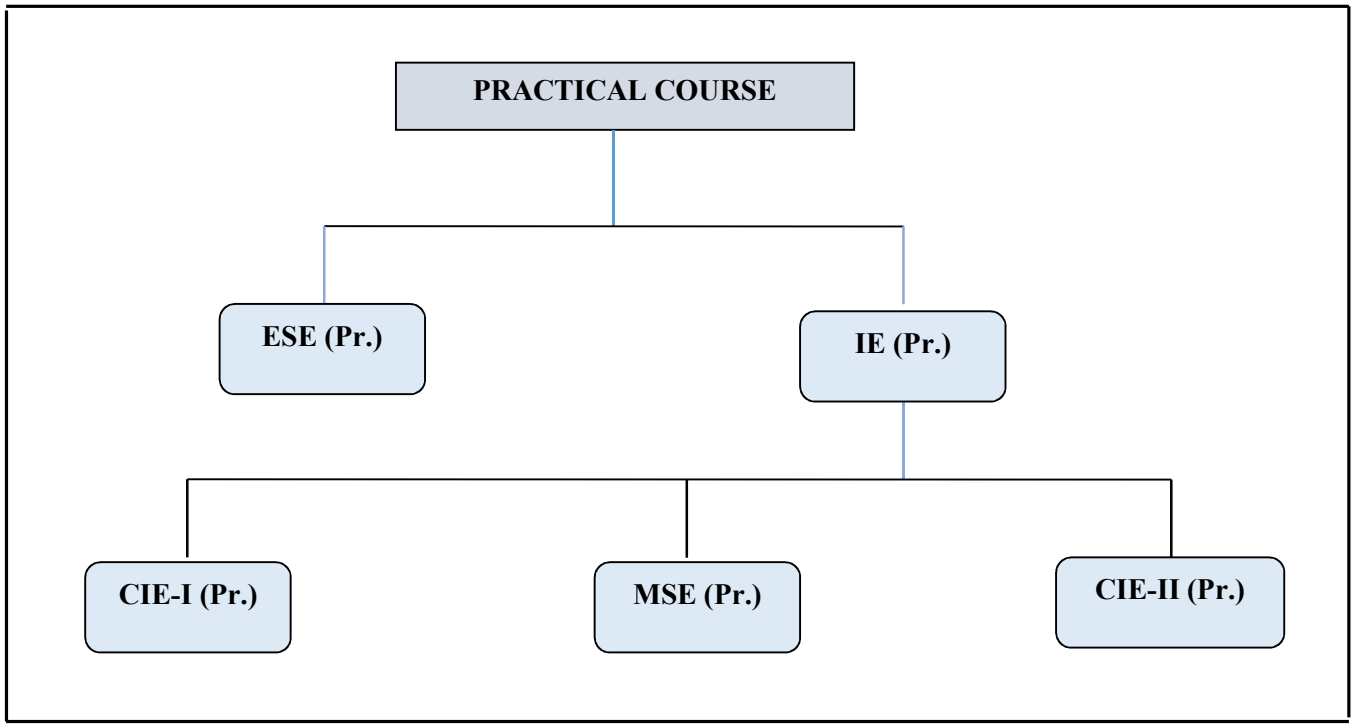
12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change

Examination System:

A. Marks Distribution of Theory Course:



B. Marks Distribution of Practical Course :



Th.: Theory, Pr**.**: Practical, **ESE:** End Semester Examination, **MSE:** Mid Semester Examination, **CIE:** Continuous Internal Evaluation.

CO Wise Marks Distribution:

Exam Entity	Theory Subject		Practical/ Studio Subject	
	Maximum Marks	CO to be Covered	CO to be Covered	Maximum Marks
CIE-I	16 (8 + 8)	1 & 2	1 & 2	24 (12 + 12)
MSE	16 (8 + 8)	3 & 4	3 & 4	24 (12 + 12)
CIE-II (Activity/ Assignment)	8 (8)	5	5	12 (12)
ESE	60	-	-	40
TOTAL	100	-	-	100

Minimum Passing Percentage in All Exams:

S No.	Program Name	Minimum Passing Percentage in		
		IE Component	ESE Component	Total Component
1	Course Work for PhD Registration	**-**	**-**	**50%**
2	B. Arch.	**-**	**45%**	**50%**
3	MBA, MCA, M.Des., M.Tech., M.Plan, MHA, MPH, MA	**-**	**40%**	**40%**
4	B. Tech., B. Des., BVA, BCA, B.Sc., BBA, B.Com., B.A.	**-**	**35%**	**35%**

SGPA Calculation

$$SGPA = \frac{C_1G_1 + C_2G_2 + \ldots\ldots\ldots + C_nG_n}{C_1 + C_2 + \ldots\ldots + C_n}$$

$$SGPA = \frac{\sum_i C_i \times G_i}{\sum_i C_i}$$

where (as per teaching scheme & syllabus):

C_i is the number of credits of subject i,

G_i is the Grade Point for the subject I and i = 1 to n,

n = number of subjects in a course in the semester

CGPA Calculation

$$CGPA = \frac{C_1G_1 + C_2G_2 + \ldots\ldots\ldots + C_nG_n}{C_1 + C_2 + \ldots\ldots + C_n}$$

$$CGPA = \frac{\sum_i C_i \times G_i}{\sum_i C_i}$$

where (as per teaching scheme & syllabus):

C_i is the number of credits of subject i,

G_i is the Grade Point for the subject I and i = 1 to n,

n = number of subjects in a course of all the semesters up to which CGPA is computed

Grading Table:

Applicable for B.Arch. & Ph.D. Courses

Academic Performance	Grade	Grade Point	Marks Range (in %)
Outstanding	O	10	90≤ x ≤100
Excellent	A+	9	80≤ x <90
Very Good	A	8	70≤ x <80
Good	B+	7	60≤ x <70
Above Average	B	6	50≤ x <60
Fail	F	0	x <50
Absent	Ab	0	Absent

Applicable for All Courses except B.Arch. & Ph.D.

Academic Performance	Grade	Grade Point	Marks Range (in %)
Outstanding	O	10	90≤ x ≤100
Excellent	A+	9	80≤ x <90
Very Good	A	8	70≤ x <80
Good	B+	7	60≤ x <70
Above Average	B	6	50≤ x <60
Average	C	5	40≤ x <50
Pass	P	4	35≤ x <40
Fail	F	0	x <35
Absent	Ab	0	Absent

CGPA to percentage conversion rule:

Equivalent % of Marks in the Program = *CGPA* *10

Award of Class

CGPA	Percentage	Equivalent Division
7.50 ≤ CGPA	75% or more	First Division with Distinction
6.00 ≤ CGPA < 7.50	60% ≤ x <75%	First Division
5.00 ≤ CGPA < 6.00	50% ≤ x <60%	Second Division
4.00 ≤ CGPA < 5.00	40% ≤ x < 50%	Pass Class

Guidelines for Massive Open Online Courses (MOOCs)

(Session 2023-24)

Poornima University, in its never ending endeavor to equip students with best-of-class learning and knowledge, has undertaken to include MOOC courses as part of its credit scheme from session 2023-24 onwards. The objective behind this is to enable students to study courses designed by the best teachers in the country and to scale their knowledge base with the rest of learners from the nation. The MOOCs which are included under this scheme is can be chosen from SWAYAM and NPTEL.

1. Introduction of MOOCs: SWAYAM and NPTEL

About SWAYAM:

SWAYAM is a programme initiated by the Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The objective of this effort is to take the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.

This is done through a platform that facilitates hosting of all the courses, taught in classrooms to be accessed by anyone, anywhere at any time. All the courses are interactive, prepared by the best teachers in the country and are available, free of cost to any learner. However learners wanting a SWAYAM certificate should register for the final proctored exams that come at a fee and attend in-person at designated centers on specified dates. Eligibility for the certificate will be announced on the course page and learners will get certificates only if this criteria is matched.

The courses hosted on SWAYAM are in 4 quadrants – (1) video lecture, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes and (4) an online discussion forum for clearing the doubts. Steps have been taken to enrich the learning experience by using audio-video and multi-media and state of the art pedagogy / technology.

In order to ensure that best quality content is produced and delivered, nine National Coordinators have been appointed. They are:

1. AICTE (All India Council for Technical Education) for self-paced and international courses
2. NPTEL (National Programme on Technology Enhanced Learning) for Engineering
3. UGC (University Grants Commission) for non-technical post-graduation education
4. CEC (Consortium for Educational Communication) for under-graduate education
5. NCERT (National Council of Educational Research and Training) for school education
6. NIOS (National Institute of Open Schooling) for school education
7. IGNOU (Indira Gandhi National Open University) for out-of-school students
8. IIMB (Indian Institute of Management, Bangalore) for management studies
9. NITTTR (National Institute of Technical Teachers Training and Research) for Teacher Training programme

Two types of courses are offered on the SWAYAM platform: Credit Courses and Non- Credit Courses. Credit courses are offered for each semester in January and July every year. The list is available on SWAYAM official website: https://onlinecourses.swayam2.ac.in/

About NPTEL:

NPTEL (National Programme on Technology Enhanced Learning), is a joint venture of the IITs and IISc, funded by the Ministry of Education (MoE) Government of India, and was launched in 2003. Initially started as a project to take quality education to all corners of the country, NPTEL now offers close to 600+ courses for certification every semester in about 22 disciplines.

Some highlights:

- Largest online repository in the world of courses in engineering, basic sciences and selected humanities and management subjects
- YouTube channel for NPTEL – most subscribed educational channel, 1.3 billion views and 40+ lakhs subscribers
- More than 56000 hours of video content, transcribed and subtitled
- Most accessed library of peer-reviewed educational content in the world
- Translation of more than 12000 hrs. of English transcripts in regional Indian languages

NPTEL Online Certification:

The objective of enabling students obtain certificates for courses is to make students employable in the industry or pursue a suitable higher education programme. Through an online portal, 4, 8, or 12-week online courses, typically on topics relevant to students in all years of higher education along with basic core courses in sciences and humanities with exposure to relevant tools and technologies, are being offered. Enrolment to and learning from these courses is free. Following these online courses, an in-person, proctored certification exam is conducted and a certificate is provided through the participating institutions and industry, as applicable.

Some statistics regarding the open online courses since March 2014 till Dec 2021

Completed courses: 3496;

Enrollments across courses: 1.58 CRORE +

Number of exam registrations: 15.1 LAKH +

All the statistics pertaining to completed courses are available at https://beta.nptel.ac.in/courses. All courses are completely free to enroll and learn from. The certification exam is optional and comes at a fee of Rs 1000/course exam.

2. MOOCs at Poornima University:

MOOCs envelops best in class teaching - learning processes along with meeting the requirements of various courses in terms of quality of teaching and evaluation system. To promote the MOOCs among students of Poornima University, it is decided to consider the credits earned through MOOCs.

(a) Options for MOOCs at Poornima University

(For this document, only those MOOCs will be considered which are available on SWAYAM & NPTEL platforms)

- Credit and Non-credit SWAYAM MOOCs can be opted by anyone, anytime, anywhere and in any language. However, prior-permission of the University Authorities is mandatory if the credits are to be transferred to a regular degree.

- In case of credit courses, there are two ways to opt these courses for the purpose of credit transfer to PU system as given below:

OPTION–I: As Open Elective (for batches entered till 2022) / Multidisciplinary Courses (for batches admitted from 2023-24 onwards):

Open Elective (for batches entered till 2022) / Multidisciplinary Courses (for batches admitted from 2023-24 onwards) are available at University level in offline mode for which relevant booklets are already published. **These courses carries 02 credits.** These category/type of courses (similar/different) are also available as MOOC courses. The respective Deans / HODs shall provide both the options to all the students to either select offline courses or MOOCs as per details given below:

- Deans / HODs shall prepare a list of upto 05 appropriate MOOC courses of 02/03 credits each, well in advance (at-least 15 days prior to commencement of semester) and take approval from the Office of Dean, Academics / Pro-President, PU.

- After approval, the respective Deans / HODs shall circulate a notice to all their respective students so that they can select any one course from the list, the credits **(only 02)** of which will be counted against Open Elective/ Multidisciplinary courses pertaining to that particular semester.

- If the students are not willing to opt for MOOC Open Elective/ Multidisciplinary courses, they can proceed with the current offline practice of opting for Multidisciplinary courses.

- The tutor of the class shall monitor the progress (assignments, feedback, any problem etc.) on a weekly basis and report to the Head/Dean.

OR

OPTION–II: As Major / Minor Courses:

- Deans / HODs shall identify a course of **03 credits** for each semester, well in advance (at-least 15 days prior to commencement of semester) and take approval from the Office of Dean, Academics / Pro-President, PU.

- After approval, the respective Deans / HODs shall circulate a notice to all their respective students citing that the particular course will be conducted through MOOCs only and is compulsory for all respective students. The credits of this course will be counted against Major/Minor courses pertaining to that particular semester.

- The tutor of the class shall monitor the progress (assignments, feedback, any problem etc.) on weekly basis and report to the Head/Dean.

- This is to be noted that if Deans / HODs decide to conduct any major/minor course in any semester through MOOCs, no offline course will be conducted against that.

(b) Important points related to MOOCs at Poornima University

- Only one MOOC shall be allowed in a particular semester for the purpose of credit transfer in the beginning.
- No attendance will be taken for MOOC courses.
- Last period of T/T/S shall be taken for MOOC courses which shall be in self-study mode.
- The method of assessments of MOOC such as assignments and examinations are completely associated with that particular MOOC and no exam will be conducted by the department as well as by the Examination Cell.
- The respective Dean / HOD must submit the detail of course i.e., code, name and credit of MOOC opted against that particular course in particular semester attached with highlighting in the related examination scheme of syllabus of that semester signed by BOS Convener / HoD and Dean of Faculty to the office of Pro-President before commencement of the classes.
- SWAYAM will award a certificate to all the students passing the examination along with the credit earned. The center of examination for SWAYAM MOOCs will be finalized by SWAYAM. All the responsibility related to registration for MOOCs, timely submission of assignments, examinations etc. will be borne by the students only.
- The list of registered students in MOOC along with name of course will be submitted to the Examination Cell by the Deans / HoDs before commencement of the classes.
- Any student who would not be able to register/present/clear/pass the MOOC in the stipulated time, it is the choice of the student that he or she may register in next semester (odd or even) with MOOC again or appear as a back exam candidate of the University as per PU norms.
- There will be no provision of re-evaluation of MOOC.
- The scorecard and related certificate of MOOC along with a consolidated list of students with marks of assignment and final exam will be submitted to the examination cell by the concerned Dean / HOD for further process. It is also recommended that alteration/changes/scaling in marks obtained by the students in any MOOC will not be considered.
- The exam registration fee of MOOC up to Max. INR 1000/- will be reimbursed to the student only after successful completion of the course in first attempt and submission of the fee receipt, score-card and certificate of the MOOC to the concerned department within stipulated time after declaration of the results.

NOTE: This is to be noted that the procedure for getting approval from BOS, Faculty Board, Academic Council and BoM is to be followed as per regular process.

Attached Items:

Open Elective Booklet	Annexure-1
Soft Skills Booklet	Annexure-2
Value Added Course Booklet	Annexure-3

BSC IN GAME DESIGN AR-VR TOTAL CREDIT TABLE

Sr. No.	Courses	Semester	Total Number of Credits	Credit Requirement according NEP
1.	Major Courses	I to VI Sem	65	60
2.	Department Elective	I to V Sem	16	24
3.	Multidisciplinary Courses	II to V Sem	08	09
4.	Ability Enhancement Courses	I to IV Sem	08	08
5.	Skill Enhancement Courses	I to V Sem	9	09
6.	Value Aided Courses	I to III Sem	06	06
7.	Project / Dissertation	VI Sem	08	-
8.	Internship	VI Sem	06	04
TOTAL			**126**	**122**

POORNIMA UNIVERSITY, JAIPUR

Faculty of FDA

Name of Program : BSc in Game design AR-VR **Duration: 3 years** **Total Credits: 126**

Teaching Scheme for Batch 2023-26

Semester-I

Course Code	Name of Course	Teaching Scheme				Marks Distribution			Credits
		Lecture (L)	Tutorial (T)	Practical (P)	SH	IE	ESE	Total	
A.	**Major (Core Courses)**								
A.1	**Theory**								
BGDCGD1101	Fundamentals of Design	2	-	-		40	60	100	**2**
BGDCGD1102	Story Design and Development	2	-	-		40	60	100	**2**
A.2	**Practical**								
BGDCGD1201	Foundation Art	1	-	2		60	40	100	**2**
BGDCGD1202	Game Design Documents	-	-	2		60	40	100	**1**
BGDCGD1203	2D Digital Animation I	1	-	2		60	40	100	**2**
BGDCGD1204	3D Game Lab I	1	-	2		60	40	100	**2**
BGDCGD1205	Exploratory I	2		2	**2***	60	40	100	**3**
B.	Minor Stream Courses**/Department Elective**								
B.1	**Theory**								
	NIL								
B.2	**Practical**								
BGDEGD1211	Digital Art	2	-	2	4*	60	40	100	**3**
BGDEGD1212	Design Thinking								
BGDEGD1213	Still Life								
C	**Multidisciplinary Courses**								
	NIL	-	-						
D	**Ability Enhancement Courses (AEC)**								
BUACHU1101	English	2	-			40	60	100	**2**
E	**Skill Enhancement Courses (SEC)**								
BULCSE1201	SEGC - 1	1	-	2		40	60	100	**2**
F	**Value Added Courses (VAC)**								
BUVCBX1103	Social Media Marketing	2	-			40	60	100	**2**
G	**Summer Internship / Research Project / Dissertation**								
	NIL								
H	**Social Outreach, Discipline & Extra Curricular Activities**								
Total		**16**		**14**	**6***				**23**
Total Teaching Hours				**30/36**					

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Teaching Scheme for Batch 2023-26

Semester-II

Course Code	Name of Course	Teaching Scheme			Marks Distribution				Credits
		Lecture (L)	Tutorial (T)	Practical (P)	SH	IE	ESE	Total	
	Major (Core Courses)								
A.1	**Theory**								
BGDCGD2101	Game Appreciation	2	-	-		40	60	100	**2**
BGDCGD2102	UI/UX Design	2	-	-		40	60	100	**2**
A.2	**Practical**								
BGDCGD2201	Game Design	1	-	2	**2***	60	40	100	**2**
BGDCGD2202	Character Development for Games	-	-	2		60	40	100	**1**
BGDCGD2203	Scripting & Programing I		-	2		60	40	100	**1**
BGDCGD2204	Photography		-	2		60	40	100	**1**
BGDCGD2205	Exploratory II	2		2	**2***	60	40	100	**3**
	Minor Stream Courses**/Department Elective**								
B.1	**Theory**								
	NIL								
B.2	**Practical**								
BGDEGD2211	2D Digital Animation II	2	-	2	**2***	60	40	100	**3**
BGDEGD2212	Foundation Art II								
BGDEGD2213	Nature Study								
C	**Multidisciplinary Courses**								
BGDEMC2121	MOOC Course - I	2	-			40	60	100	**2**
D	**Ability Enhancement Courses (AEC)**								
BUACHU2103	Language & Conversation	2	-	-		40	60	100	**2**
E	**Skill Enhancement Courses (SEC)**								
BULCSE2201	SEGC - 2	1	-	2		40	60	100	**2**
F	**Value Added Courses (VAC)**								
BUVCCE2101	Security in Computing	2	-	-		40	60	100	**2**
G	**Summer Internship / Research Project / Dissertation**								
	NIL								
H	**Social Outreach, Discipline & Extra Curricular Activities**								
Total		**16**		**14**	**6***				**23**
Total Teaching Hours				**30/36**					

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Teaching Scheme for Batch 2023-26

Semester-III

Course Code	Name of Course	Teaching Scheme				Marks Distribution			Credits
		Lecture (L)	Tutorial (T)	Practical (P)	SH	IE	ESE	Total	
A.	**Major (Core Courses)**								
A.1	**Theory**			-					
BGDCGD3101	Game Development & Documentation (Case Studies)	2	-	-		40	60	100	**2**
BGDCGD3102	Script Writing For Games	2	-	-		40	60	100	**2**
A.2	**Practical**								
BGDCGD3201	Game Engine I	1	-	2	**2***	60	40	100	**2**
BGDCGD3202	Game Texturing	-	-	2	**2***	60	40	100	**2**
BGDCGD3203	Exploratory III	1	-	4	**2***	60	40	100	**3**
B.	Minor Stream Courses**/Department Elective**								
B.1	**Theory**								
B.2	**Practical**								
BGDEGD3211	Game Level Design	2		4		60	40	100	**4**
BGDEGD3212	Illustration								
BGDEGD3213	New Media Exploration								
C	**Multidisciplinary Courses**								
BGDEMC3121	MOOC Course - II	2	-						**2**
D	**Ability Enhancement Courses (AEC)**								
BUACHU3106	Interpersonal Communication & Grooming	2	-			60	40	100	**2**
E	**Skill Enhancement Courses (SEC)**								
BGDCGD3601	3D modeling (Maya)		-	4					**2**
F	**Value Added Courses (VAC)**								
BUVCHU1101	Sports for Life	2	-						**2**
G	**Summer Internship / Research Project / Dissertation**								
	NIL								
H	**Social Outreach, Discipline & Extra Curricular Activities**								
Total		**14**		**16**	**6***				**23**
Total Teaching Hours				**30/36**					

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Teaching Scheme for Batch 2023-26

Semester-IV

Course Code	Name of Course	Teaching Scheme				Marks Distribution			Credits
		Lecture (L)	Tutorial (T)	Practical (P)	SH	IE	ESE	Total	
A.	**Major (Core Courses)**								
A.1	**Theory**								
BGDCGD4101	Character Design Concepts	2	-	-		40	60	100	**2**
BGDCGD4102	Augmented reality and Virtual reality	2	-	-		40	60	100	**2**
A.2	**Practical**								
BGDCGD4201	3D Animation for Games		-	2	**2***	60	40	100	**1**
BGDCGD4202	Game FX	2	-	2		60	40	100	**3**
BGDCGD4203	Game Engine II	1		2	**2***	60	40	100	**2**
BGDCGD4204	Exploratory IV	1		4	**2***	60	40	100	**3**
	Minor Stream Courses/**Department Elective**								
A.1	**Theory**								
B.2	**Practical**								
BGDEGD4211	Sound Design for Games	1	-	4		60	40	100	**3**
BGDEGD4212	Motion Graphics								
BGDEGD4213	3D Dynamics and Simulation								
C	**Multidisciplinary Courses**								
BGDEMC4121	MOOC Course - III	2	-						**2**
D	**Ability Enhancement Courses (AEC)**								
BUACHU4212	Communication Skills-I		-	2		40	60	100	**1**
E	**Skill Enhancement Courses (SEC)**								
BGDCGD4601	Substance Painter	1	-	2		40	60	100	**2**
F	**Value Added Courses (VAC)**								
	NIL								
G	**Summer Internship / Research Project / Dissertation**								
	NIL								
H	**Social Outreach, Discipline & Extra Curricular Activities**								
Total		**12**		**18**	**6***				**21**
Total Teaching Hours				**30/36**					

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Name of Program : B.Sc. in Game design AR-VR Duration: 3 years Total Credits: 126

Teaching Scheme for Batch 2023-26

Semester-V

Course Code	Name of Course	Teaching Scheme				Marks Distribution			Credits
		Lecture (L)	Tutorial (T)	Practical (P)	SH	IE	ESE	Total	
A.	**Major (Core Courses)**								
A.1	**Theory**			-					
BGDCGD5101	Quality Assurance for Games	2	-	-		40	60	100	**2**
BGDCGD5102	Research In Gaming	2	-	-		40	60	100	**2**
A.2	**Practical**								
BGDCGD5201	Advance Game Engine	2	-	2		60	40	100	**3**
BGDCGD5202	Advance AR - VR Studio	1	-	4		60	40	100	**3**
BGDCGD5203	Advanced FX for Games			4	**2***	60	40	100	**2**
BGDCGD5204	Exploratory V	1	-	4	**2***	60	40	100	**3**
	Minor Stream Courses/Department Elective								
B.1	**Theory**								
B.2	**Practical**								
BGDEGD5211	Advance Programming in C++ Lab	2	-	2		60	40	100	**3**
BGDEGD5212	UIUX Design								
BGDEGD5213	Lighting & Rendering								
C	**Multidisciplinary Courses**								
BGDEMC5121	MOOC Course - IV	2	-			40	60	100	**2**
D	**Ability Enhancement Courses (AEC)**								
	NIL		-						
E	**Skill Enhancement Courses (SEC)**								
BGDCGD5601	3D Animation (Maya)		-	4					**2**
F	**Value Added Courses (VAC)**								
	NIL		-						
G	**Summer Internship / Research Project / Dissertation**								
	NIL								
H	**Social Outreach, Discipline & Extra Curricular Activities**								
Total		**12**		**20**	**4***				**22**
Total Teaching Hours				**32/36**					

POORNIMA UNIVERSITY, JAIPUR

Faculty of FDA

Name of Program : B.Sc. in Game design AR-VR **Duration: 3 years** **Total Credits: 126**

Teaching Scheme for Batch 2023-26

Semester-VI

Course Code	Name of Course	Teaching Scheme				Marks Distribution			Credits
		Lecture (L)	Tutorial (T)	Practical (P)	SH	IE	ESE	Total	
A.	**Major (Core Courses)**								
A.1	**Theory**			-					
	Nil								
A.2	**Practical**								
A.1	**Minor Stream Courses/Department Elective**								
B.1	**Theory**								
	Nil								
B.2	**Practical**								
	Nil								
C	**Multidisciplinary Courses**								
	Nil		-						
D	**Ability Enhancement Courses (AEC)**								
	Nil		-						
E	**Skill Enhancement Courses (SEC)**								
	Nil								
F	**Value Added Courses (VAC)**								
	Nil		-						
G	**Summer Internship / Research Project / Dissertation**								
BGDCGD6601	Internship	-	-	12					**6**
BGDCGD6501	FINAL REPORT	-	-	16		60	40	100	**8**
H	**Social Outreach, Discipline & Extra Curricular Activities**								
Total				**28**					**14**
Total Teaching Hours				**28**					

VISUAL ART ANIMATION DEPARTMENT

GAME DESIGN, AR & VR

BATCH - 2023-2026

CODE: BGDCGD1101	FUNDAMENTALS OF DESIGN	2 CREDITS [LTP: 2-0-0]

OBJECTIVE OF THE COURSE:

To enable a student to develop the ability to:

CO- 1 Create, document and preserve an original body of graphic design work.

CO- 2 to be able to think and communicate critically about his/her own work

CO- 3 Continuously reflect on one's own work in terms of elements and principles of graphic design.

CO- 4 Monitor and assess one's creative abilities over a period through the designs produced.

CO- 5 Identify one's own strengths and weaknesses in creating works of graphic design.]

OUTCOME OF THE COURSE:

1. The subject aims to impart knowledge of principles behind fundamentals of Design
2. To understand the language of Visual Communication
3. To be able to apply elements of design into any creation
4. To analyse the principles of design.
5. To evaluate Role of Design in Society

A. OUTLINE OF THE COURSE

Unit	Title of the unit	Time required for the Unit (Hours)
1	**Introduction and History of Design**	6
2	**Visual Communication**	8
3	**Elements of design**	8
4	**Principles of Design**	8
5	**Role of Design in Society**	6

B. DETAILED SYLLABUS

Unit No.	Unit Details
1.	**Introduction and History of Design**
	● Introduction of Unit ● History ● Forms of design ● Art and design ● Conclusion of Unit
2	**Visual Communication**

	● Introduction of Unit ● Semantics and Secondary research ● Pragmatics and syntactic ● Case study ● Conclusion of Unit
3	**Elements of design**
	● Introduction of Unit ● Line, Shape, Volume, ● Color, value, Thereto ● Conclusion of Unit
4.	**Principles of Design**
	● Introduction of Unit ● Gestalt Law's for art and design ● The Design process ● Conclusion of Unit
5.	**Role of Design in Society**
	● Introduction of Unit ● Poster design as Social Commentary ● Propaganda design: USA, German, Soviet. ● Designing for society ● Conclusion of Unit

A. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1.	**Universal Principles of Design**	**William Lidwell Kritina -Holden Jill Butler**	**Latest**
2.	**Handbook of Visual Communication: Theory, Methods and Media**	**Ken Smith Sandra Moriarty Gretchen Barbatsis Keith Kenney**	**Latest**

CODE: BGDCGD1102	STORY DESIGN AND DEVELOPMENT	2 CREDITS [LTP: 2-0-0]

OBJECTIVE OF THE COURSE:

This subject lay the foundation for story visualization. It enables ones to create script out of stories and understand different narrow modes and their mediums along films.

OUTCOME OF THE COURSE:

CO - 1 the subject aims to impart knowledge of Understanding Story
CO - 2 to understand the development of story narratives
CO - 3 to be able to apply the story to the script.
CO - 4 to analyse the graphic narratives
CO - 5 to evaluate Role of Graphic narrative

A. OUTLINE OF THE COURSE

Unit	Title of the unit	Time required for the Unit (Hours)
1.	Understanding Story	8
2.	Story Narratives and its Development	8
3.	Story to Script	7
4.	Graphic Narratives	11
5.	Case study in Graphic Narratives	2

B. DETAILED SYLLABUS

Unit No	Unit Details
1.	**Understanding Story**
	• Introduction of the Unit • Resources and ideas from life • Understanding Story from Literature and Films. • Examining indigenous narratives, both contemporary and traditional to gain an understanding of Storytelling methods pertinent to our culture. • Linear & nonlinear storytelling • Imagery building: Visual association to the narration - To know about the form in which the story is tool • Conclusion of Unit.
2.	**Story Narratives and its Development**
	• Introduction of the Unit • Narrative: Introduction to narrative structures (Indian and Western) • Modes of Narrative • Plot & Character: Action Plots & Mind Plots. Analysis of different types of plots, Developing Characters, Storytelling and its relevance in society- character driven stories – Event driven stories. • Archetypes v/s Stereotypes - understanding of archetypes and a brief introduction to the monocyte (hero's Journey). • Conclusion of Unit.
3.	**Story to Script**
	• Introduction of the Unit • Content, frameworks, and contexts, Script Styles,

	● Submission Scripts, and Shooting Scripts, ● Specific Screenplays- Page Properties and Script Length ● Script - interpretation and visualization for animated films. ● Conclusion of Unit
4.	**Graphic Narratives**
	● Introduction of the Unit ● History of Graphic Narratives - Indian, Eastern and Western ● Elements of Graphic Narrative Design – Framing, Composition, Color, visual allusion, style and meaning, Cultural context, text and image, etc. ● Expressing simple to complex visualization for different Genre stories like – social, personal, science fictions, Action Comics, History and Fantasy through the use of Graphic Narratives. ● Conclusion of Unit.
5.	**Case study in Graphic Narratives**
	● Introduction of the Unit ● Illustrating for– Newspaper- Magazines, Text books, Gag cartoons – Editorials ● Comic on Internet - Motion Comics. ● Conclusion of Unit.

B. RECOMMENDED STUDY MATERIAL:

Sr.No.	Reference Book	Author	Publication
1.	**Story: Substance, Structure, Style and The Principles of Screenwriting**	**Robert McKee**	**1997**
2.	**Animation from script to screen**	**Shamus Culhane**	**1990**
3.	**Animation Writing and Development**	**Jean Ann Wright**	**2005**
4.	**Ideas for the Animated short- Finding and building stories**	**Karen Sullivan, Gary**	**2008**
5.	**Graphic Storytelling and Visual Narrative**	**Eisner Will**	**2008**
6.	**Framed Ink - Drawing & Composition for Visual Storyteller**	**Marcos Mateu-Mestre**	**2010**

BGBCGD1201	FOUNDATION ART- I	2 CREDITS [LTP: 1-0-2]

OBJECTIVE OF THE COURSE:

This course enables the students to learn the medium of Drawing and its importance in visualization. This course allow student to learn to observe, analyse and visualize. Course allow the student to practice drawing to support the future Animation Design.

OUTCOME OF THE COURSE:

1. The subject aims to impart knowledge of drawing.
2. To understand drawing from nature
3. To be able to apply perspective drawing.
4. To analyse the lighting and shading
5. To understand basic proportions in figure drawing

. OUTLINE OF THE COURSE

UNIT NO.	TITLE OF THE UNIT	TIME REQUIRED FOR THE UNIT (HOURS)
1	Introduction to drawing materials	10
2	Drawing from Nature	20
3	Perspective drawing	15
4	Lighting & Shading	15
5	Figure Drawing	12

B. DETAILED SYLLABUS

Unit No.	Unit Details
1	**Introduction to drawing materials**
	● Introduction of Unit ● Papers-Different pencils. ● Colours pencils-Crayons and poster colours. ● Introduction to drawing the objects, figures from surroundings. ● To learn, observation, analysing and drawing the mechanical objects, utensils, and objects from everyday life. ● Conclusion of Unit
2	**Drawing from Nature**
	● Introduction of Unit ● Location drawing and learning to represent trees, plants, bushes, shrubs, insects, birds, and animals with attention to structure and morphology, proportion, volume, and behaviour. ● Dramatizing what has been recorded ● Conclusion of Unit
3	**Perspective drawing**
	● Introduction of Unit ● To learn the importance of Perspective ● Rules of perspectives – To learn one point – two point perspectives- Learn to draw from different eye levels and different angles. ● Conclusion of Unit
4	**Lighting & Shading**
	● Introduction of Unit ● To introduce to the concept of light in visualization. ● To study objects in Lighting and learn to draw them with proper shading

	● Drawing figures/ sketching figures from live Drawing plants, trees, flowers, fruits ● Conclusion of Unit
5	**Figure Drawing**
	● **Introduction of the Unit** ● **Introduction to Figure Drawing** ● **Learning Stick Figures** ● **Practice with Lines and Stick Figures** ● **Mannequin Drawings** ● **Drawing Figures in Blocks** ● **Drawings from different eye-levels.** ● **Basic Anatomical Study** ● **Creative Forms of Aliens with Balanced Anatomy;** ● **Conclusion of Unit**

C. RECOMMENDED STUDY MATERIAL:

Sr.No	Reference Book	Author	Publication
1.	Perspective Drawing Handbook	Joseph D'Amelio	Latest
0.	Fun with the Pencil	Loomis	Latest
0.	Dynamic Figure Drawing	Burne Hogarth	Latest
0	Complete Book of Drawing Technique	Peter Stanyer	Latest

Code: BGDCGD1202	Game Design Documents	1 Credits [LTP: 0-0-2]

OBJECTIVE OF THE COURSE:

This subject will provide all team members with a deep understanding of the game's overview and how it works. This actually helps in communicating between different departments hassle-free and reduces confusion and the amount of back-and-forth saving you a lot of time. The purpose of a game design document is to unambiguously describe the game's selling points, target audience, gameplay, art, level design, story, characters, UI, assets, etc.

OUTCOME OF THE COURSE:

CO.1 To understand the intricacies of Game Design process
CO.2 To critically analyse the existing games designs
CO.3 Understand the design stages of Game Design Document
CO.4 Design a Game Design Document or similar document required during pre-production stage of any creative job like advertising, film making, and obviously game development.
CO5. Learn the technical process of Game Design and develop a design document for a Digital Game.

. **OUTLINE OF THE COURSE**

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	GDD Overview	8
2	GDD –Life Cycle layout	18
3	Mechanics of GDD	10
4	Game Level/World Design	6
5	Analysis of games For GDD	6

B. DETAILED SYLLABUS

UNIT NO.	UNIT DETAILS
1.	GDD Overview
	• Introduction of Unit • Game Concept • Target Audience • Game Flow Summary • Look and Feel of the game • Genres of the game • Conclusion of Unit

2.	GDD –Life Cycle layout
	• Introduction To Unit • Life Cycle of Game • Gameplay Objectives/Rules • Game Progression • Play Flow • Mission/challenge Structure • Puzzle Structure • Conclusion of Unit

3.	Mechanics of GDD
	• Introduction of Unit • Rules of the game • Model of the game universe • Physics of the game • Economy of the game • Character movement in the game • Actions/ Replaying and saving of the game • Conclusion of Unit
4.	**Game Level/World Design**
	• Introduction of Unit. • Game World • Training Level of the game • Synopsis of the game • Relevance to the Level story • Maps, Background Level • Conclusion of Unit
5.	**Analysis of games For GDD**
	• Introduction of Unit • Analysis of different games • Analysis of games like Mario, Tetris, Pubg, Valorant,CS,Among Us etc. • Assignment: GDD of the game • Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Game development and production	Erik Bethke	Latest
2	Game Design	Bob Bates	
3	Challenges for Game Designers	Brenda Romero and Ian Schreiber	Latest

Code: BGDCGD1203	2D Digital Animation II	2 Credits [LTP: 1-0-2]

OBJECTIVE OF THE COURSE: This course imparts the knowledge of the natty gritty and nuances of Animation. The tools and techniques that used to do traditional, experimental or 2D digital animation are all compiled as exercises which will enable the students to discover the art of motion. It also emphasises on the workflow to create 2D Digital Animation and managing scenes for animation production.

OUTCOME OF THE COURSE:

CO.1 The subject aims to impart knowledge of History of Animation Techniques
CO.2 to understand the Animation Fundamental – Time and Space
CO.3 to be able to apply the Animation Fundamental – Principles.
CO.4 to Experiment in Animation
CO.5 Export scene into Final Movie

A. **OUTLINE OF THE COURSE**

UNIT NO.	TITLE OF THE UNIT	TIME REQUIRED FOR THE UNIT (HOURS)
1.	History of Animation Techniques	8
2.	Animation Fundamental I – Time and Space	12
3.	Animation Fundamental II – Principles	20
4.	Experiments in Animation	18
5.	Export Movie	2

B. DETAILED SYLLABUS

UNIT	UNIT DETAILS
1.	**History of Animation Techniques**
	● Introduction to Unit ● History of animation: Cave paintings ● Animation toys - Building Animation toys –Thaumatrope -Phenakistoscope – ● Shadow puppetry, Magic lantern. ● Flip Book ● Conclusion of Unit
2.	**Animation Fundamental I – Time and Space**
	● Introduction to FPS, usage and importance of Frame by Frame. ● Understanding different rhythms of animation ● Executing straight ahead ,pose to pose and limited animation ● Drawing key frames, breakdowns, in-betweens, animation cycles ● Exercise on Timing and Spacing (Ball Bounce)
3.	**Animation Fundamental II – Principles**

	● Introduction to Unit ● Timing ● Squash and Stretch ● Anticipation ● Follow-Through ● Overlapping Action ● Arcs ● Ease-In and Ease-Out ● Exaggeration ● Staging ● Solid Drawing ● Appeal

4.	**Experiments in Animation**
	● Introduction to Unit ● Understanding the 3 methods of animation – ● Frame by Frame creation of animation - traditional 2D, Pixilation, Stop Motion ● Modification of object or image to produce animation- paint on glass, sand on glass, simple Claymation without armatures etc. ● Manipulation of objects to produce animation- 2D cut out animation, 3D Claymation with armatures, simple object animation, Puppets, etc. ● Conclusion of Unit
5.	**Export Movie**
	● Introduction of Unit ● File Management ● Library Management ● Workspace customization ● Compressions. ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

SR.NO	BOOK	AUTHOR	PUBLICATION
1.	The Animator's Survival Kit	Williams, Richard	Faber; 2009
2.	The Illusion of Life – Essays on Animation	Cholodenko, Alan	Power Publication in association with Australian Film Commission;1991
3.	Cartoon Animation by Preston Blair	Blair, Preston	Walter Foster Publishing;1994
4.	Action Analysis for Animators	Webster, Chris	Focal Press; 2012

Code: BGDCGD1204	3D Game Lab 1	1 Credits [LTP:1-0-2]

OBJECTIVE OF THE COURSE:

This subject will introduce basic skills - Modelling/Texturing, lighting, and rendering techniques in Blender application. The below units would provide the skills necessary to create simple props, texture the props, do a simple lighting setup and understand the basics in Maya environment.

OUTCOME OF THE COURSE:

CO. 1 Understanding 3D space and using coordinates.

CO. 2 Familiarizing with modelling tools, manipulating standard primitives to form complex shapes.

CO. 3 Using shading and textures to simulate look and feel complementing the model and intended idea**.**

CO. 4 Applying Light effects in real world and applying those principles in 3D space.

CO. 5 Conclude 3D project in photorealistic & animation Format.

A. OUTLINE OF THE COURSE

UNIT NO.	TITLE OF THE UNIT	TIME REQUIRED FOR THE UNIT (HOURS)
1	Blender Basics Interface	8
2	Modelling – Game Design	18
3	Basic of Texturing	10
4	Basic of Lighting	6

5	**Basic of Rendering**	**6**

B. DETAILED SYLLABUS

UNIT	UNIT DETAILS
1.	**Blender Basics Interface**
	● Introduction of Unit ● 2D v/s 3D Game Design ● Basic 3D workspace introduction, Isometric views ● Transformation tools, Basic Shapes,Vertex,Edges,Faces ● Project management ● Duplicating and Instances. ● Loading Image-planes ● Conclusion of Unit

2.	**Modelling – Game Design**
	● Introduction To Low Poly Modelling ● Using Shapes, Line , curves ● Use Geometry Tool ● Props & Assets for game design ● Handling of Vertex,Edges,Faces ● Using Poly Editing Tools. ● Exercise 1 – Game Assets ● Exercise 2 – Game Background design Level 1 ● Conclusion of Unit
3.	**Basic of Texturing**
	● Introduction of Unit ● Understanding shading ● Using different types of shaders and Materials ● Controlling specular and reflection. ● UV Unwrapping of objects ● Conclusion of Unit
4.	**Basic of Lighting**
	● Introduction of Unit ● Study of real world lighting for Backgrounds ● Understanding Shading ● Understanding Shadows ● Analyze techniques used by Renaissance artists ● Understanding 3 Point Lighting. ● Using Blender Lights ● Conclusion of Unit
5.	**Basic of Rendering**
	● Introduction of Unit ● Basic of Render Settings. ● Basic of camera set up, Render resolution, Pixels ● Render Setup,Cycles,EVE ● Rendering Images.

C. RECOMMENDED STUDY MATERIAL:

SR. NO	REFERENCE BOOK	AUTHOR	PUBLICATION
1	Learning Blender: A Hands-On Guide to Creating 3D	Oliver Villar	Latest
2	Blender 3D Incredible Machines	Christopher Kuhn	Latest

BGDCGD1205	Exploratory I	3 Credits[LTP: 1-0-4]

Individual Project on Game Design Background with Props and assets: Game design is the art of applying design and aesthetics to create a game for entertainment or for educational, exercise, or experimental purposes. Mechanics and systems, which are the rules and objects in the game. Gameplay, which is the interaction between the player and the mechanics and systems.

OBJECTIVE OF THE COURSE: To conceptualize and to generate stronger ideas, critical viewings of Gamification, and brainstorming and synthesis of ideas, Scripting and Concepts to visually plan out the entire game play of the Game.
OUTCOME OF THE COURSE: Create an entire project from conceptualization, brainstorming and synthesis of ideas, designing of game background at level 1 with inclusion of game assets and props used by the game character to visually plan out the entire Gamification technique using 3D software.
PROJECT GUIDELINES: To Set Production Values High. Selection of an area that needs explanation in time, Select a topic that fulfils the requirements of the project, Study material on the subject includes done by and ensure that it is not visualized in the same manner, Comprehend the context of application, Visualize the idea in the form of a new concept blueprints, Develop a technique to visualize, Modelling/Texturing/Lighting the environment, Using 3D software

Code: BGDCGD1211	Digital Art I	3 Credits [LTP: 2-0-2]

OBJECTIVE OF THE COURSE:

The purpose of this subject is to provide the students with training methodologies and specific industry skills that will assist them in developing creative ideas into digital art with emphasis on image manipulation, matte painting and image creation and editing. The students will receive information that will enable them to:

- Understand the design principles used in creation of digital art.
- Familiarize yourself with the terminologies and concepts for creating and manipulating digital images.

OUTCOME OF THE COURSE:

CO.1 the subject aims to impart knowledge of theories of perception

CO.2 to understand the Digital Tools, Hardware for Digital Painting

CO.3 to understand raster and vector graphic tools.

CO.4 to apply the tools in creating digital art

CO.5 to evaluate different tools for digital art

A. **OUTLINE OF THE COURSE**

UNIT NO.	TITLE OF THE UNIT	TIME REQUIRED FOR THE UNIT (HOURS)
1.	**Theories of Perception**	**8**
2.	**Digital Tools, Hardware for Digital Painting**	**8**
3.	**Introduction to Raster Graphics Tools**	**12**
4.	**Introduction to Vector Graphics Tools**	**12**
5.	**Applications**	**8**

B. **DETAILED SYLLABUS**

UNIT NO.	UNIT DETAILS
1	**Theories of Perception**
	• Introduction of Unit • Understanding light: Electromagnetic spectrum, CMYK and RGB • Analogy vs. Digital • Conclusion of Unit
2	**Digital Tools, Hardware for Digital Painting**
	• Introduction of Unit • Image Format and Color Representations • Image and File Formats • File Compressions. • Properties of Bitmap Image. • Resolutions for Print and Display, Digital colour Representation. • Conclusion of Unit
3	**Introduction to Raster Graphics Tools**

	• Introduction of Unit • Layers • Adjustment Tools • Painting • Creating raster artworks. • Image Manipulation. • Color Manipulation. • Layer Blending, Masking, Export Parameters. • Conclusion of Unit
4	**Introduction to Vector Graphics Tools**
	• Introduction of Unit • Creating Vector Arts • Paths and Shapes • Vector brushes and colours • Layers, Transparency, Grouping, Blending Modes, Managing Artwork, Single and Multi-Page Illustrations. • Conclusion of Unit
5	**Applications**
	• Introduction to Unit • Digital Painting • Images Restoration • Images manipulation and collages • Vector Art – Graphics and Illustrations • Print and Web graphics • Conclusion of Unit

C. **RECOMMENDED STUDY MATERIAL:**

Sr.No	Reference Book	Author	Publication
1	Best Practices for Graphic Designers: Color Works	Eddie Opara John Cantwell	Rockport Publishers (1 January 2014)
2	Design Elements, Typography Fundamentals: A Graphic Style Manual for Understanding How Typography Affects Design	Kristin Cullen	Rockport Publishers (1 June 2012)
3	Grid Systems in Graphic Design: "A Visual Communication Manual for Graphic Designers, Typographers and Three Dimensional Designers"	Josef Muller-Brockmann	Antique Collectors Club; Bilingual edition (1 January 1999)

BGDEGD1212	Design Thinking- I	3 Credits [LTP: 2-0-2]

. **OBJECTIVE-** The main objective of the course is understanding the theoretical concepts in Architecture. Introduction of theoretical paradigm, methodologies, and mode of enquiries. Promote creative thinking, Exposure to different approaches of design process and hence enhance the students design capacity through a multi-dimensional approach to problem solving.

A. COURSE OUTCOMES:

CO1: Appreciate various design process procedures.
CO2: Generate and develop design ideas through different techniques.
CO3 Identifies the significance of reverse Engineering to Understand products.
CO4: Draw technical drawing for design ideas
CO5: To elaborate design process as an experience

C. OUTLINE OF THE COURSE:

Unit No.	Title of the unit	Time Required for the Unit (Hours)
1	**Introduction to Thinking**	9
2	**Techniques of Creative Thinking**	3
3	**Design Process**	9
4	**Interrelation of Creativity and Design**	9
5	**Design as an experience**	6

D. DETAILED SYLLABUS:

Unit	Content
1.	**Introduction to Thinking**
	● Theories of thinking, ● Process of thinking and various types of thinking like convergent, divergent thinking, directive thinking. ● Concept of "creativity"
2.	**Techniques of Creative Thinking**
	● Importance and need of creative thinking ● Various creative thinking techniques like brainstorming ,checklists, mind mapping and exercises on problem solving ● Importance and Role of creativity in design process
3.	**Design Process**
	● Understanding the design process ● Understanding the different types of theories such as linear, cyclic etc. ● Stages in design process: concept, scheme, design development, analysis ● Strategies to design problem solving ● Design Ideas and concepts with examples
4.	**Interrelation of Creativity and Design**
	● Understanding the application of creativity in different fields such as industrial design, product design etc. ● Understand the process of creativity through case studies of various architects such as Zaha Hadid, Philip Johnson,Robert Venturi etc.

5.	Design as an experience
	● Themes that have informed 20th century architecture and urbanism: History and historicism, ● Type and typology, The nature of the site, the constructed site, Tectonic and the constructed object, Modernism, Structuralism, Deconstruction, Phenomenology, Post Modernism

E. MODEL EXERCISE/ ASSIGNMENTS/ PROJECTS:

- MCQs / Quizes / Google Form
- Seminar presentations (Student works open for all) / Multimedia presentations/ PPT'sReport writing / written assignment/ Google classroom.
- Essays/ / Models based on individual exercises.Skits/ Role Play/ Sketches Group Discussions / Flipped Classrooms

F. RECOMMENDED STUDY MATERIAL

Sr. No.	Book	Author	Edition	Publication
1.	The Encyclopedia of Pastel Technique	Martin Judy	2011	Search Press
2.	Illustrated elements of Art and Principles of Design	Gerald F. Brommer	2010	Crystal Productions
3.	Perspective Made Easy	Earnest R Norling	2007	BN Publishing
4.	Perspective	Milind Mulick	2015	Jyotsana Prakashan
5.	Thinking With Type	Ellen Lupton	2010	Princeton Architechtural Press

BGDEGD1213	Still Life	3 Credits [LTP: 2-0-2]

. **OBJECTIVE- Student able to-**

- Exercise and demonstrate use and mastery of the elements of art.
- Develop visual literacy.
- Analyse, interpret and evaluate the form, light and shade of works of art.
- Identify use materials ,tools and processes from a variety of media
- Create original objects of art in a specific medium.
- Plan and select appropriate media relative to concepts and forms of art.
- Exemplify and explore mediums –Charcoal, Drawing inks, Dry Pastels, Oil Pastels, Pencil/pen, Photo colours, Water colour, etc.

B. COURSE OUTCOMES:

CO1: Observe and create object study by transforming into three-dimensional form making on two – dimensional surface with focus on observation (denotative form), shape and proportion through hands training and on practices.
CO2: Implement observation and analysis of object form, material, texture etc. and execute detail drawing of still-life objects along drapery from different angles in different medium.
CO3: Analyse, interpret and evaluate the form, light and shade of works of art.
CO4: Create original objects of art in a specific medium.
CO5: Plan and select appropriate media relative to concepts and forms of art.

C. OUTLINE OF THE COURSE:

Unit No.	Title of the unit	Time Required for the Unit (Hours)
1	**Line and its Importance**	10
2	**Geometric Shapes and Forms**	18
3	**Tones and Values**	16
4	**Object drawing - I**	20
5	**Figure Drawing**	20

D. DETAILED SYLLABUS:

Unit	Contents
1.	**Line and its Importance**
	● Types of Line: Contour Lines, Gestural Lines, Broken Lines ● Use of line to express Emotions. ● Live line drawings of using pencil, waterproof ink. ● Draw random line drawings of using pencil, waterproof ink.

2.	**Geometric Shapes and Forms**
	● Draw Basic Shapes and Forms: cube, cone, and sphere. ● Understanding of Complex Form and effect of Light upon them.
3.	**Sketching**
	● Draw line drawing of live object through pencil on newsprint sheet (Minimum 20) ● Draw live object line drawing through Ink newsprint sheet (Minimum 20) ● Draw live object line drawing through Charcoal newsprint sheet (Minimum 20)
4.	**Tones and Values**
	● Introduction of unit ● Knowledge of Tones and Values and their Practical Implementation ● Various techniques to Create tones
5.	**Object drawing**
	● Draw various object of using pencil, pen-Ink, charcoal, poster color, Derwent pencil. ● Observation of objects of Daily use, the forms they have an effect of light on them ● texture of organic materials. (Feather, furniture, mud-based utensils). ● Object drawing with drapry.

F. RECOMMENDED STUDY MATERIAL

Sr. No.	Book	Author	Edition	Publication
1.	The Encyclopedia of Pastel Technique	Martin Judy	2011	Search Press
2.	Illustrated elements of Art and Principles of Design	Gerald F. Brommer	2010	Crystal Productions
3.	Perspective Made Easy	Earnest R Norling	2007	BN Publishing
4.	Perspective	Milind Mulick	2015	Jyotsana Prakashan
5.	Thinking With Type	Ellen Lupton	2010	Princeton Architechtural Press

BULCSE1201 **SEGC – 1** **2 Credits [LTP: 2-0-0]**

COURSE OUTCOMES:

- **CO-1**
- **CO-2**
- **CO-3**
- **CO-4**
- **CO-5**

	LIST OF ACTIVITIES
1	SMART Goals, Goal Setting (IKIGAI), Wheel of Satisfaction, Exchanging pleasantries
2	Root Words, Prefix-Suffix, Antonyms, Synonyms & Analogies, Sentence Correction-1
3	Numbers, Relations & Functions, HCF & LCM, Average & Divisibility
4	Resume Tips & Resume Review
5	How to win friends & Influence people, Sentence Correction-2
6	Series & Progressions
7	Number Series & Letter Series, Crypto-arithmetic, SWOT/SWOC
8	Percentage, Profit & Loss, Ratio Proportion, CI & SI
9	Mixtures and Allegations, Short Cut Tricks, Seating Arrangement, Sequencing & Ranking
10	Surds & Indices, Problem on ages, Solving Equations - Quadratic & Linear
11	Time & Distance, Boats & Streams, Clocks and Calendars
12	GD, Practice of GD, Reading and Comprehension

Code: BGDCGD2101	Game Appreciation	Credits [LTP: 2-0-0]

OBJECTIVE OF THE COURSE:

Understand video games as a tool of storytelling and entertainment. Students will explore information about earlier games to current games. Students will have discussions and observe the creative aspects of digital interactive form of art i.e. Digital games.

- Learn History and evolution of digital games. Learn to explore and appreciate digital games in terms of a Game Designer.
- Understand the concept of process of Game Development and Game Development parts.
- Explore various popular digital games and to analyse them critically.
- Share each other's experiences of different games
- Understand the fundamentals of Digital Games starting from games in general then digital games. Students learn about the elements of a game.
- There will be examples of number of games in class. Student need not to play all of them, but he should play some of them, or, at least, watch YouTube videos of game play.

OUTCOME OF THE COURSE:

After the completion of this course, students will be able to:.

- Understand digital games and its elements.
- Students will be able to look at Games as digital medium for story telling
- Students will make up their mind if and which field of Game Production suit them.
- Students will explore and enjoy the story telling capabilities of games.
- Students will learn to critically analyse the digital games.

OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Evolution & History of Games	4
2.	Process of Game Development	10
3.	Game Analysis	12
4.	Case Studies of Games	10
5.	Game Play Sessions	12

1. DETAILED SYLLABUS

Unit	Unit Details
1.	**Evolution & History of Games**
	● Introduction of Unit ● What is Game? ● Game Genre ● Elements of a game ● Balance in a game ● Visualizing the Game ● Idea generation for games ● Conclusion of Unit
2.	**Process of Game Development**
	● Introduction of Unit ● Stages of game Development: ● Design, Art, Coding etc. ● What is GDD, ● Types of GDD ● Sample GDD ● Conclusion of Unit
3.	**Game Analysis**
	● Introduction of Unit ● Game Analysis of of famous Game Tetris ● Fortnite: battle Royale. ● Mario game Analysis ● Pub g game Analysis ● Game Analysis of some popular games by students. ● .Conclusion of Unit
4.	**Case Studies of Games**
	● Introduction of Unit ● Case Study In context of popularity of game play ● Case Study : Mario ● Case Study : Pub G Game ● Case Study : Valorant game ● **Exercise:** Presentations by students on an era or particular game from “History of Games”. ● Conclusion of Unit
5.	**Game Play Sessions**
	● Introduction of Unit ● Video Showcase of Popular Games ● Fundamentals of Game technology While playing ● Controls ,Button, Gamepad ● Top Games In Industry ● Conclusion of Unit

1. RECOMMENDED STUDY MATERIAL:

Sr.No	Book	Author	Publication
1.	A Playcentric Approach to Creating Innovative Games	Fullerton Tracy	(2014), RC Press/Taylor & Franci
2.	History of Video Games	Paris, David	2017
3.	Game Development and Production	Erik Bethke	Wordware Publishing, Inc. (2003)
4.	The Comic Book Story of Video Games: The Incredible History of the Electronic Gaming Revolution,	Jonathan Hennessey	(2017) Potter / Ten

Code: BGDCGD2102	UI UX Design	Credits [LTP: 2-0-0]

OBJECTIVE OF THE COURSE:

The subject introduces HCI and user Interface design. They impart sound knowledge of design thinking. It also prepares the student to design based on user experience and user cantered.

OUTCOME OF THE COURSE:

CO.1 The subject aims to impart knowledge of principles behind Human Computer interaction (HCI)

CO.2 To understand User Interface requirements

CO.3 To recognize the importance of User Experience Design (UXD or UED)

CO.4 To understand various methods of User Cantered Design

CO.5 To demonstrate effective UI / UX designs with case studies

OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	**Introduction to HCI**	6
2	**User Interface Design (UI)**	8
3	**User Experience Design (UXD or UED)**	8
4	**User Cantered Design**	8
5	**Case Studies**	6

B. DETAILED SYLLABUS

UNIT NO.	UNIT DETAILS
1.	**Introduction to HCI**
	● Introduction of Unit ● Human-Computer Interaction Foundations ● Models & Theories ● Programming interactive systems ● Conclusion of the Unit
2.	**User Interface Design (UI)**
	Overview of UI – Importance of UI – Characteristics Design Process Visual design Concepts Graphical User interface Design Tools
	● Navigation and structure ● Composition and Layout Design ● Design Icons – Graphic symbols – typography – color theory ● Design Patterns and Style guides ● Interaction Styles ● Naming & Abbreviations.
3.	**User Experience Design (UXD or UED)**
	● Overview of UX ● Elements of UX ● UX Design Process – Research – Design – Prototyping – Testing – Measurements ● UX Analysis, Design Thinking – Thinking out of box – Empathy – Design Thinking Process ● User research, Planning.
4.	**User Centered Design**
	● Introduction, Principles ● Elements of UCD ● User Centered design Process – Analysis – Design – Implementation – Deployment ● Benefits of user centered process.
5.	**Case Studies**

	• Introduction of Unit • Effective UI Design examples • UX Design examples • Common Errors • Conclusion.

B. RECOMMENDED STUDY MATERIAL

SR.NO	REFERENCE BOOK	AUTHOR	PUBLICATION
1.	UX AND UI Design	Mackenzie - Elsevier; First edition (11 January 2013)	Human Computer Interaction
2.	UX AND UI Design	Elizabeth Goodman Ph.D. School of Information University of California Berkeley Dr., Mike Kuniavsky , Andrea Moed - Morgan Kaufmann - 2 edition (24 September 2012)	Observing the User Experience: A Practitioner's Guide to User Research

Code: BGDCGD2201 Game Design 2 Credits [LTP: 1-0-2]

OBJECTIVE OF THE COURSE: To make students learn the art and techniques of designing digital games and document it in a systematic way to provide Students with the opportunity to make meaningful decisions in relation to playing the game.

OUTCOME OF THE COURSE: After the completion of this course, students will be able to:

- Students will understand the process of designing games
- Students will be able to undertake Game Production

OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Making Games	4
2.	Game Play and Game Mechanics	10
3.	On Movement	12
4.	Game Characters and Items	10
5.	Assignment on Game Design and Development	12

DETAILED SYLLABUS

Unit	Unit Details

1.	**Making Games**
	● Introduction of Unit ● Game Play and Game Data ● Designers and Development Process ● The Designer's role in Game Development Process ● Conclusion of Unit
2	**Game Play and Game Mechanics**
	● Introduction of Unit ● Game play and the fun factor ● Play Element ● Mechanics of Game Play ● modelling Reality ● Conclusion of Unit
3	**On Movement**
	● Introduction of Unit ● Graphic Interface Requirement ● Game Statistics for Movement ● Terrain Features ● Movement Algorithm ● Conclusion of Unit
4	**Game Characters and Items**
	● Introduction of Unit ● Creating Player Characters ● Item Categories ● Game functions of Items ● Structuring Stories in Games ● Conclusion of Unit

5.	**Assignment on Game Design and Development**
	● Introduction of Unit ● Pre-Production ● Production ● Post-Production ● Assignment : Level Design /Character Design with Props and Assets Conclusion of Unit

0. RECOMMENDED STUDY MATERIAL:

Sr.No	Book	Author	Publication
1	Basics of Game Design	Michael Moore (2011)	CRC Press
2	Level Up! - The Guide to Great Video Game Design	Scott Roge	2018

Code: BGDCGD2202	Character Development for Games	1 Credits [LTP: 0-0-2]

OBJECTIVE OF THE COURSE:

Understand the Fundamentals of Character Design. Learning the process of character creation in visual form this subject will provide an intermediate level of aspects of 3D – modelling, texturing and animation techniques in Blender application. The below units would provide the skills necessary to create simple backgrounds in 3D, create & manage textures maps. The surface properties also called the shading parameters are explained. Further it continues with animation techniques.

OUTCOME OF THE COURSE:

CO.1 Describe characteristics of well-designed and executed characters

CO.2 Ability to generate complex models of Products with correct proportions
CO.3 Explore biped proportions and exaggerations to create basic anima table models.
CO4. Understanding muscle loops to edit models to be able to animate as per joint placements
CO.4 Ability to map 3D models in 2D UV space and adjust to suit painting needs
CO.5 Learning mechanics of Motion and applying principles of animation.

A. OUTLINE OF THE COURSE

UNIT NO.	TITLE OF THE UNIT	TIME REQUIRED FOR THE UNIT (HOURS)
1	**Experimenting on 3D modelling Technique**	13
2	**3D modelling Production pipeline**	12
3	**Character modelling**	15
4	**Concepts of materials and textures, Introduction to UV unwrapping UV mapping.**	10
5	**Animation and Mechanics of motion**	10

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Experimenting on 3D modelling Technique**
	● Introduction To modelling ● Blocking, ● Details, Vertex, Edges, Faces ● Constructing a Good Model (the importance of quads, problem with Ngons). ● Mesh optimization. ● Importance of line flow. ● Conclusion of Unit.
2.	**3D modelling Production pipeline**
	● Introduction of Unit. ● Understanding Muscle flow for deformation ● Simple Assets, Props modelling ● Simple Quadruped modelling ● Understanding nature of different materials and achieving different types of ● Texture surfaces such as wood, glass, etc., ● Understanding bitmap and procedural mapping. UV layout for complex props. ● Conclusion of Unit
3.	**Character modelling**
	● Introduction of Unit. ● Simple Character modelling ● Hand Modelling ● Torso modelling ● Face modelling ● Clothes & Assets modelling ● Conclusion of Unit.
4.	**Concepts of materials and textures, Introduction to UV unwrapping &UV mapping.**
	● Introduction of Unit. ● Using the material Editor in Blueprints ● Procedural v/s non-Procedural Textures

	● 2D and 3D textures ● Using Anisotropic Shader UV Mapping ● Laying Out UVs (understanding the UV space, performing UV layout) ● Texture Mapping (creating color map, bump and specular). ● Conclusion of Unit.
5.	**Animation and Mechanics of motion**
	● Introduction of Unit. ● Mechanics of Walking. ● Animating Walks, Gravity, Momentum & Weight. ● Timing, Arcs & Natural Motion. ● Secondary Actions, Posing, Animating with Poses. ● Following Animation Principles in 3D character animation. ● Conclusion of Unit

A. RECOMMENDED STUDY MATERIAL:

SR. NO	REFERENCE BOOK	AUTHOR	PUBLICATION
1	**Characters and Viewpoint**	**Orson Scott Card**	**Latest**
2	**Creating Characters with Personality: For Film, TV, Animation, Video Games and Graphics**	**Tom Ban Croft and Glen Keane**	**Latest**

CODE: BGDCGD2203 SCRIPTING & PROGRAMING I 1 CREDITS [LTP: 0-0-2]

OBJECTIVE OF THE COURSE

This course enables the students to:

Learn the programming concepts while working on a project in any game engine. However, the mentioned syllabus is in reference to the Unreal game engine, but students are free to use any game engine and programming language. Learn Game Engines and Programming Language for Game Development.

OUTCOME OF THE COURSE:

- This course enables the students to:
- develop a game using programming skills in a game engine

- This is a project-based paper. First students will learn the basic interface and functions of Unreal Development Kit (UDK) Game Engine then they will develop a game project and learn. Students may choose any project Under guidance of the teacher. The project should help students to explore basic concepts of Game Engine And Programming Language.

. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	C #language Introduction	10
2.	Creating a C# Script File	12
3.	Introducing Operator, Variables	12
4.	Conditional Statements and If	8
5.	While Loop, Classes and Functions	6

A. DETAILED SYLLABUS

UNIT	UNIT DETAILS
1.	C #language Introduction
	• Introduction of Unit • The .NET Framework - an Overview • Framework Components • Types of Applications which can be developed using MS.NET • MS.NET Base Class Library • MS.NET Namespaces • MSIL / Metadata and PE files. • The Common Language Runtime (CLR) • Managed Code • MS.NET Memory Management / Garbage Collection • Common Type System (CTS) • Common Language Specification (CLS) • Types of JIT Compilers • Conclusion of Unit

2.	**Creating a C# Script File**
	● Introduction of Unit ● Entry point method – Main ● Compiling and Building Projects ● Using Command Line Arguments ● Importance of Exit code of an application ● Different valid forms of Main ● Compiling a C# program using command line utility CSC.EXE ● Conclusion of Unit
3.	**Introducing Operator, Variables**
	● Introduction of Unit ● String ● Integer ● Arithmetic Operators ● Relational Operators ● Logical Operators ● Conclusion of Unit
4.	**Conditional Statements and If**
	● Introduction of Unit ● If statement ● Switch statement ● Conclusion of Unit
5.	**While Loop, Classes , Functions & Array**
	● Introduction of Unit ● While loop ● For Loop ● Array ● Classes, Objects, Inheritance ● Project: Making program for game design ● Conclusion of Unit

A. RECOMMENDED STUDY MATERIAL:

Sr.No	Reference Book	Author	Publication
1	C# in Depth	Jon Skeet	Latest
2	Pro C# 7: With .NET and .NET Core	Andrew Troelsen and Philip Japikse	21 November 2017

CODE: BGDCGD2204	PHOTOGRAPHY	1 CREDITS [LTP: 0-0-2]

OBJECTIVE OF THE COURSE:

Develop a solid grounding in photography – from camera handling, to getting the right exposure, optimizing manual functions and composition. Participants will develop their photographic eye through a blend of lectures, practical assignments and critiques

- Illustrate a full understanding of the use of all the tools and materials needed in creating traditional fine art photographs.
- Understand and develop a sense of the language of photography, its history and ultimately its potential as a communicative medium.
- Through evaluation and discussion, learn to think critically and articulate intellectual, aesthetic and emotional responses to photographs.
- Course objectives will be reached through a series of assigned projects supported by lectures, demonstrations independent lab work, presentations and critiques.

OUTCOME OF THE COURSE:

- Understand the history & evolution of photography art & equipment.
- Demonstrate the ability to choose the right settings of exposure for given lighting conditions.
- Demonstrate the ability to compose the shot in the aesthetically pleasing composition setting.
- Develop the understanding of studio & outdoor lighting techniques that govern the art of Photography.
- Demonstrate effective critical thinking skills (including analysis, critical evaluation, creative thinking, innovation, inquiry, and synthesis) in their study of the art of Photography as a technique of visual communication.

OUTLINE OF THE COURSE:

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	History of Photography	4
2.	Exposure triangle	10
3.	Composition Techniques	12
4.	Lighting techniques	10
5.	Creative Photography	12

DETAILED SYLLABUS

Unit	Unit Details
1.	History of Photography
	• Introduction of Unit • Principle of the camera obscure • To study few photographers like Ansell Adams, Dorothea Lange, Robert Cape etc. • Aesthetics of Photography both in documentary and Creative photography. Conclusion of Unit
2.	Exposure triangle
	• Introduction of Unit • Understanding exposure and controls • Aperture, f-stop , depth of field, • Shutter Speed, Exposure value, • ISO, Image Stabilization, sensor Conclusion of Unit
3.	Composition Techniques

	● Introduction of Unit ● Composition & techniques ● Rule of Thirds ● Elements of composition, cinematography ● Shot Framing techniques ● Conclusion of Unit
4.	**Lighting techniques**
	● Introduction of Unit ● Spectrum, Color Temperature ● Practical Understating and practice of Lighting techniques, Kinds or lights indoor and outdoor. ● Electronic flash and artificial lights, Light meters ● Different kinds B & W and color photography. ● Conclusion of Unit
5.	**Creative Photography**
	● Introduction of Unit ● Macro Photography ● Freeze Frame Photography ● Light Painting ● HDRI and Panoramas ● Conclusion of Unit

RECOMMENDED STUDY MATERIAL:

SR. NO	REFERENCE BOOK	AUTHOR	PUBLICATION
1.	20th century photography	Taschen	The Museum Ludwig's 1980
2.	The Art of Photography: An Approach to Personal Expression	Bruce barnbaum	Kendall/Hunt *Publishing* 1994
3.	Complete_Digital_Photography	Ben long	Boston, Mass. : Charles River Media 2001
4.	Camera Lucida	Roland Barthes	Hill & Wang 1980

Code : BGDCGD2205	Exploratory II	3 Credits [LTP: 1-0-4]

Individual Project/3D/2D Background Development with Character Design

A game concept, in its simplest form, is **the easy-to-understand vision you have for your game**. It's also a way for you to sell your game idea. Your game concept should include exactly what the game is and what creating it involves. This includes the story, the art, and how you're going to make money with the game

OBJECTIVE OF THE COURSE:

In the video game industry, game design describes the creation of the content and rules of a video game. The goal of this process for the game designer is **to provide players with the opportunity to make meaningful decisions in relation to playing the game.**

OUTCOME OF THE COURSE:
To develop creativity and individuality in problem solving and performing tasks. **To prepare students to work in teams**. To prepare students to improve their skills and knowledge related to specific job positions individually. To enable students to do self-study

Project Guidelines:
Selection of an area that needs explanation in time, Select a topic that fulfills the requirements of the project, Study material on the subject done by other Gamers/ students and ensure that it is not visualized in the same manner, Comprehend the context of application, Visualize the idea in the form of a Gaming storyboard, Develop a technique to visualize, Programming, Animate the idea, Using effects, music, or voice will need discretion.

Code: BGDCGD2211	2D Digital Animation II	3 Credits [LTP: 2-0-2]

OBJECTIVE OF THE COURSE:

This course offers advanced understanding of the art of motion, continuing the learning of principles and skills. Observations and analysis of Movements and Actions are primarily focused to break down the complexity of animate and inanimate beings and objects.

OUTCOME OF THE COURSE:

CO.1 Able to learn mechanics of motion
CO.2 Learn to give motion to biped
CO.3 Animate Quadruped and bird in motion
CO.4 Animate and Properties of Matter
CO.5 Able to sync sound and background score

B. **OUTLINE OF THE COURSE**

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Mechanics of Motion	8
2.	Biped Motion	12
3.	Quadruped and Bird Motion	10
4.	Animation and Properties of Matter	10
5.	Sound Sync and Background Design	8

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Mechanics of Motion**
	● Introduction to Unit ● Mechanics of Motion ● Newton's Laws of Motion ● Conclusion of Unit
2.	**Biped Motion**
	● Introduction to Unit ● Head turns ● Biped Walk Cycle ● Biped Run Cycle ● Acting and Movement ● Weight and Balance

	● Character Gesture Animation ● Conclusion of Unit
3.	**Quadruped and Bird Motion**
	● Introduction to Unit ● Four legged Animal walk ● Four Legged animal gallop ● Bird basic flight cycle ● Conclusion of Unit
4.	**Animation and Properties of Matter**
	● Introduction to Unit ● Understanding properties of matter ● Making use of the wave principle, delayed secondary action, slow and fast action, overlapping action, follow through, use of anticipation, action, reaction ● Effects Animation - flames, smoke, water, rain, etc. ● Conclusion of Unit

5.	**Sound Sync and Background Design**
	● Introduction of Unit ● Character Lip-sync ● Sound Synchronization ● Animated Background Scenes, Scene Management, Editing Scenes. ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr.No	Book	Author	Publication
1.	The Animator's Survival Kit	Williams, Richard	Faber; 2009
2.	Animation: The Mechanics of Motion	Webster, Chris	Focal Press; 2005
3.	Eadweard Muybridge - Horses and other animals in motion	Muybridge, Eadweard	Dover Publications INC.;1985
4.	Eadweard Muybridge - The Human Figure in Motion	Muybridge, Eadweard	London Chapman & Hall ;1907
5.	Cartoon Animation by Preston Blair	Blair, Preston	Walter Foster Publishing;1994
6.	Action Analysis for Animators	Webster, Chris	Focal Press; 2012

BGDEGD2213	**Nature Study**	**3Credits [LTP: 2-0-2]**

. **OBJECTIVE-**

Drawing exercises are to learn accurate observation and skills of graphic presentation. Free- hand drawing exercise from objects and nature to study proportion, volume and visual perspective, suggestion of solidity by line as well as light and shade, realization of rhythmic relationship between.

B. COURSE OUTCOMES:

CO1: Students will be able to understand the Human Anatomy

CO2: Students will be able to apply Basic Geometric Shapes and Similarities While studying Architectures

CO3: Students will be able to obtain the skill of Memory Drawing

CO4: Students will be able to obtain maximum result in minimum effort

CO 5: Students will be able to observe and analyse forms

C. OUTLINE OF THE COURSE:

Unit No.	Title of the unit	Time Required for the Unit (Hours)
1	**Line and its Importance**	10
2	**Leaf Drawing**	18
3	**Tones and Values**	16
4	**Nature drawing**	20
5	**Sketching**	20

D. DETAILED SYLLABUS:

Unit	Contents

1.	**Line and its Importance**
	● Types of Line: Contour Lines, Gestural Lines, Broken Lines ● Use of line to express Emotions. ● Live line drawings of using pencil, water proof ink. ● Draw random line drawings of using pencil, water proof ink.
2.	**Leaf Drawing**
	● Draw Basic Shapes and Forms: cube, cone, sphere. ● Understanding of Complex Form and effect of Light upon them.
3.	**Tones and Values**
	● Introduction of unit ● Knowledge of Tones and Values and their Practical Implementation ● Various techniques to Create tones
4.	**Nature drawing - I**
	● Draw various object of using pencil, pen-Ink, charcoal, poster color, Derwent pencil. ● Observation of objects of Daily use, the forms they have an effect of light on them ● Texture of organic materials. (Feather, furniture, mud based utensils).
5.	**Sketching**
	● Brief introduction to the concept of sketching &its implementation. ● Rapid Sketches of Human Being, Nature, Animals and Constructions. ● Submission of Sketches in Different Mediums

E. MODEL EXERCISE/ ASSIGNMENTS/ PROJECTS:

(a) Individual and in groups- Presentations, Case study, Discussions and Practical assignments as submission to be taken

F. RECOMMENDED STUDY MATERIAL

Sr. No.	Book	Author	Edition	Publication
1.	The Encyclopedia of Pastel Technique	Martin,Judy	2011	Search Press
2.	Illustrated elements of Art and Principles of Design	Gerald F. Brommer	2010	Crystal Productions
3.	Perspective Made easy	Ernest R Norling	2007	BN Publishing
4.	Perspective	MilindMulick	2015	JyotsnaPrakashan
5.	Thinking with Type	Ellen Lupton	2010	Princeton Architectural Press

Code: BGDCGD3101	Game Development & Documentation (Case Studies	2 Credits [LTP: 2-0-0

OBJECTIVE OF THE COURSE:

Understand the Fundamentals of Game Production parts when been developed level by level in department. All the necessary documentation required by the developer to maintain the integrity of the game.Studing different Case studies of different games to amylase the market role over strategies.

OUTCOME OF THE COURSE:

1. Learn the different outlook to the game design elements.
2. Ability to understand the different production part of the game design.
3. Explore different market games available in market and able to analyses it.
4. Learning Different Departments of game design in companies.
5. Ability to construct the outline of game thorough production parts.

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	Game Production Parts	13
2	Game production Departments	12
3	Game Production Documentation	15
4	Case studies of different popular games	10
5	Analysis of case studies in different gaming sectors.	10

A. DETAILED SYLLABUS

Unit	Unit Details
1.	Game Production Parts

	• Introduction To Game production parts • **Design Parts** • Lead Designers/Visionary • Game Mechanics • Level/Mission Designers • Story and Dialogue Writers • **Coding Parts** • Lead programmer, Game Mechanics programmer, Audio programmer. • Audio Parts • Management Parts • Conclusion of Unit.
2.	**Game production Departments**
	• Introduction of Unit. • Design Department • Quality Assurance Department • Business Parts Department • Promoting, Buying, and Selling Parts Department • Manuals and Strategy Guides Department • Conclusion of Unit.
3.	**Game Production Documentation**
	• Introduction of Unit. • Licensing Parts Documentation • Game Development Documentation • Assurance of Documentation for games • Leangle Documentation for games • Conclusion of Unit.

4.	**Case studies of different popular games**
	• Introduction of Unit. • Case study of different games like PUBG • Mario bros • Tetris • Call of duty • Among us • Conclusion of Unit.
5.	**Analysis of case studies in different gaming sectors**
	• Introduction of Unit. • Different companies making games for different sectors • Analysis of game market • Conclusion to case studies of different games in PPT form • Presentation of case studies of games in different sectors • Conclusion of Unit

A. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Elements to game Design	Robert Zubek	Latest
2	Game documentation in real world	James Thomson Radik	Latest

Code: BGDCGD3102	Script Writing for Games	2 Credits [LTP: 2-0-0]

OBJECTIVE OF THE COURSE:

The purpose of scriptwriting is to create the main concept of your video production in written form. It provides a predetermined Look at what will be said and what scenes will be shot to match the overall message you're trying to portray. Script will help you plan ahead as you prepare the many different aspects that will come together to make the final product. Writing a script will also give you a better idea of the direction you'd like to go with your strategy. It may give you a better idea of who you want to be in the video and what their role will be. You'll be able to decide whether you're going to have an actor or an owner of the business be the one in the video and whether they'll do a voiceover or be on-screen.

OUTCOME OF THE COURSE:

1. Learn the different outlook to the game design elements.
2. Ability to understand the different production part of the game design.
3. Explore different market games available in market and able to analyses it.
4. Learning Different Departments of game design in companies.
5. Ability to construct the outline of game thorough production parts.

. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	Video games Writing Essentials	13
2	Writing Video games Characters	12
3	Writing Video games Scene and Dialogs	15
4	World building for video games	10
5	Interactive narrative	10

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Video games Writing Essentials**
	● Introduction To unit ● Playing a Story: What's different about videogame writing ● Bringing story to game mechanics—goals, objects, actions, space, rules. ● interactive storytelling ● Essentials for writing for video games ● Conclusion of Unit.
2.	**Writing Video games Characters**
	● Introduction of Unit. ● Creating Characters, Gameplay, and Theme ● Character goals (extrinsic and intrinsic) and tactics ● Merging character and theme with gameplay. ● Protagonist and Antagonist characters ● Features, moves, moods, behavior ● Conclusion of Unit.
3.	**Writing Video games Scene and Dialogs**

	● Introduction of Unit. ● Interactive Story Structure ● Dialogue. Character voice. Scene construction ● Long and short questions ● Script formatting. Types of scenes—CGI cut scenes, in-engine cut scenes, scripted events, incidental dialogue. ● Writing cut scenes, cinematic.
4.	World building for video games
	● Introduction of Unit. ● Fundamental of building the game world ● Assets and Writing ● Understanding the totality of the game experience ● Exploration of game "assets"—art, music, animation. The "feel" of a game. ● Environment lock like through scripting ● Conclusion of Unit.
5.	Interactive narrative
	● Introduction of Unit. ● Narrative design principles ● writing as reward, lingering, the feedback loop ● Storytelling in linear levels and open world levels. ● Player choices and interactivity to game play ● Game experience, character experience ● Make a Script of the game including all the units as a assignment ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	How to write and script for the game designig	Michael Rogan	Latest
2	The game narrative ToolBox	Heussner Tobias	Latest

BGDCGD3211	Game Level Design	3 Credits[LTP: 2-0-4]

OBJECTIVE OF THE COURSE:

This subject will provide an introduction to basic skills - Modelling/Texturing, lighting and rendering techniques in Autodesk Maya application. The below units would provide the skills necessary to create simple props, texture the props, do a simple lighting setup and understand the basics in Maya environment.

OUTCOME OF THE COURSE:

1. Understanding 3D space and using coordinates
2. Familiarizing with modelling tools
3. Manipulating standard primitives to form complex shapes
4. Studying Light and its effects in real world and applying those principles in 3D space
5. Using shading and textures to simulate look and feel complementing the model and intended idea

A. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	Maya Basics	8
2	Modelling - layout	18
3	Lighting and Rendering	10
4	N-cloth for Modelling	6
5	Texturing	6

B. DETAILED SYLLABUS

UNIT	UNIT DETAILS
1.	**Interface Basics**
	● Introduction of Unit ● 2D v/s 3D ● Basic 3D workspace introduction, Isometric views ● Transformation tools, Basic Primitives ● Project management ● Duplicating and Instances. ● Loading Image-planes ● Conclusion of Unit
2.	**Modelling**
	● Introduction To Nubs ● Using EP, CV curves ● Use Sculpt Geometry Tool ● Props with Nubs. ● Converting NURBS to Polygons ● Using Poly Editing Tools. ● Exercise 1 – Layouts

	● Exercise 2 – Interiors ● Conclusion of Unit
3.	**Lighting and Rendering**
	● Introduction of Unit ● Study of real world lighting ● Understanding Shading ● Understanding Shadows ● Analyse techniques used by Renaissance artists ● Understanding 3 Point Lighting. ● Using Maya Lights ● Render Settings. ● Conclusion of Unit
4.	**N-Cloth**
	● Introduction of Unit. ● Using N cloth to simulate a simple table sheet. ● Adjusting properties ● Using constraints to create and modify a curtain ● Using properties to simulate different types of cloths and simulate pillows etc. ● Conclusion of Unit
5.	**Texturing**
	● Introduction of Unit ● Understanding shading ● Using different types of shades ● Controlling specular and reflection. ● Conclusion of Unit

C.RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Maya 2008 Character Modelling and Animation: Principles and Practices	Teresa Flaxman	Latest
2	Advanced Maya Texturing and Lighting	Lee Lanier	Latest

Code: BGDCGD3202	Game Texturing	2 Credits [LTP: 0-0-4]

OBJECTIVE OF THE COURSE:

The main purpose of Substance Painter is **to texture models**. It's advanced masking and procedural texturing tools allow you to make textures that are much harder to achieve in purely 2D programs like Photoshop.

OUTCOME OF THE COURSE:

1. The subject aims to impart knowledge of texturing Interface
2. To understand the Project Management
3. To be able to apply the texturing Techniques for Genre.
4. To understand different Maps for texturing
5. To be able to apply Multi environment background and textures to assets.

. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	Create Project Substance Painter	5
2	Baking & Masking Layers	5
3	Base Material & particles	14
4	Projections & Substance Share/Source	10
5	Terminology	14

B. DETAILED SYLLABUS

Unit	Unit Details

1.	**Create Project Substance Painter**
	● Introduction of Unit ● Create New Project and ● Reimport Models ● Basic Controls and Interface 2D and 3D Views ● Baking ● Conclusion of Unit
2.	**Baking & Masking Layers**
	● Introduction of Unit ● World Space Normal ● Ambient Occlusion ● Curvature Position ID, Normal, Thickness ● Base Color Roughness , Metallic Material ● Layers and UVs , Masks , Procedural Generators ● Conclusion of Unit
3.	**Base Material & particles**
	● Introduction of Unit. ● Types of Material ● Customized Generators ● Creation of a Base Material from Scratch ● Predefined Parameters and Brushes Alphas, Lazy Mouse and Symmetry , Create Custom Brushes and Save Them ● Particle Brushes, Properties of Particles ,Particles Using Masks ● Conclusion of Unit
4.	**Projections & Substance Share/Source**
	● Introduction of Unit. ● Preparing Textures ● Stencil ● Cloning ● Substance Share ● Substance Source , Textures.com ● Conclusion of Unit
5.	**Terminology**
	● Introduction of Unit. ● Normal Map ● Padding or Bleed ● Mipmapping ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Beginning PBR Texturing	Abhishek KUMAR	20 May 2020
2	Substance Designer book: A year of materials	epaquiet	27 May 2021

Code: BGDCGD3201	Game Engine I	2 Credits [LTP: 1-0-2]

OBJECTIVE OF THE COURSE:

Development of programming skills using software environment of game engine and its scripting language. 3D concepts for game play, modeling, and programming. Roles needed in software development team. Contrast creation of original 3D object models for game world with incorporation of procreated generic models.

OUTCOME OF THE COURSE:

1. The Game Studio for control of objects and interactions in 2D and 3D game worlds.
2. Students develop communication skills through course exercises and assignments to be able to describe a complex software project to a general audience.
3. Framework for 3D game development with identification of roles needed in development team.
4. Integrate art and models into a game world

5. Manage a software project using version control software
6. Obtain, evaluate and incorporate 3d models or Create 3d models with 3d tools

A.OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	**Intro to Unity and Unity Setup**	5
2	**Unity Basics**	5
3	**Using Prefab Objects**	14
4	**Getting Started with AI /Third Person Mechanics**	10
5	**Building a Scene**	14

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Intro to Unity and Unity Setup**
	● Introduction of Unit ● Set Up unity account, download software etc. ● Join the community of Unity engine/background of software ● configure the Collaborate tool that will be used throughout the course ● sort of games have been developed with it ● Conclusion of Unit
2.	**Unity Basics**
	● Introduction of Unit ● Development Tools ● Sprites ● Simple Movement. Simple Rotation and Scaling, Easy Input Handling in Unity ● Game Objects and how to transform them and add colors ● Conclusion of Unit
3.	**Using Prefab Objects**
	● Introduction of Unit. ● prefab Game Objects ● Modeling ,texturing, lighting, ● Normal Mapping, Uv texturing, Shedders ● Developing Assets and Props of game ● Conclusion of Unit
4.	**Getting Started with AI /Third Person Mechanics**
	● Introduction of Unit. ● Unity Colliders, Physics Materials ● Parent-Child Objects, Collision Layers ● Creating and Destroying Object, Activating and Deactivating Object ● Defining Classes, Run-Time Exceptions, Moving Cameras, Sound Files ● Conclusion of Unit
5.	**Building a Scene**

	● Introduction of Unit. ● Creating New Scenes, Building a Tile World ● Scripting Scene Changes ● Setting Boundaries, Mini-Maps ● Wrapping Background, • Scrolling Game Mechanics ● Making a Small game with Environment, Assets ,Props ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Game Development with Unity	Michelle Menard	Latest
2	Unity Game Development Cookbook: Essentials for Every Game	Book by Jon Manning, Paris Buttfield-Addison, and Tim Nugent	Latest

Code: BGDCGD3601	**Rigging and Motion capture for games**	**2 Credits [LTP: 0-0-4]**

OBJECTIVE OF THE COURSE:

Motion capture pipeline from calibrating the system and capturing data to editing data and applying data to animated characters. Students follow the 3D computer animation production process to complete short animations or game projects. The end products are expected to be animations of quality that will be in professional demo reel.

COURSE OUTCOME:

. Understand the theory and practice of motion capture technology.

a. Understand the 3D computer animation production process.

b. Develop an animation to be included in a professional portfolio Learn technical terms related to 3D computer animation And Motion capture technology. Enhance the ability to discuss current issues related to 3D computer animation.

c. Demonstrate the ability to offer both technical and aesthetic criticisms

d. Create an on-line "process book" as a web site or blog that documents the conceptual, technical, and artistic development throughout the semester. Understand the latest technology and develop new applications in motion capture.

. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	History of Motion capture	5
2	Calibrations & capture (Blade)(xsense)	5
3	Applying Motion to a skeleton(Motion Builder)	14
4	Camera shots IK, binding skin, IK/FK blend	10
5	Building a Scene	14

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**History , Motion capture**
	● Introduction of Unit ● Overview and history, mocap in video games and movies ● character pipeline development ● Optitrack system overview/tutorial ● Skeleton Binding tutorial - retarget motion onto characters, adjusting models to fit data ● Conclusion of Unit
2.	**Calibrations & capture (Vicon Blade)or xsense**
	● Introduction of Unit ● Calibration and Capture with VICON System ● Pipeline, Cleaning and editing data ● Data formats and math ● Skeletal editing ● Data catpture and character modeling assignment ● Conclusion of Unit
3.	**Applying Motion to a skeleton(Motion Builder)**

	● Introduction of Unit. ● Char_to_char, Coordinate systems, Editing & blending ● Data application: props ● Data application: composing, Applying motions to a skeleton ● Conclusion of Unit
4.	**Camera shots IK, binding skin, IK/FK blend**
	● Introduction of Unit. ● Data application ● Rigging and ik binding, Hand capture ● Applying motions to a character and creating a 3D animatic ● Conclusion of Unit
5.	**Track, referencing, scripting, Light_types, basic lighting, lighting animation**
	● Introduction of Unit. ● Facial capture ● Puppet capture ● human anatomy ● Motion capturing of a character through motion capturing technique Assignment ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Mocap for artist	Midori Kitagawa	Latest
2	Motion Capture	Sara Green	Latest

Code: BGDCGD3203	Exploratory III	3 Credits [LTP: 1-0-4]

Individual Project2D/3D Game Design with Motion capture technology and Unity Engine
A game concept, in its simplest form, is **the easy-to-understand vision you have for your game**. It's also a way for you to sell your game idea. Your game concept should include exactly what the game is and what creating it involves. This includes the story, the art, and how you're going to make money with the game

OBJECTIVE OF THE COURSE:
In the video game industry, game design describes the creation of the content and rules of a video game. The goal of this process for the game designer is **to provide players with the opportunity to make meaningful decisions in relation to playing the game.**

OUTCOME OF THE COURSE:
To develop creativity and individuality in problem solving and performing tasks. **to prepare students to work in teams**. to prepare students to improve their skills and knowledge related to specific job positions individually. to enable students to do self-study.

Project Guidelines:
Selection of an area that needs explanation in time, Select a topic that fulfils the requirements of the project, Study material on the subject done by other Gamers/ students and ensure that it is not visualized in the same manner, Comprehend the context of application, Visualize the idea in the form of a Gaming storyboard, Develop a technique to visualise, Programming, Animate the idea, Using effects, music, or voice will need discretion.

Code: BGDCGD4101	Character Development for Games	2 Credits [LTP: 2-0-0]

OBJECTIVE OF THE COURSE:

Understand the Fundamentals of Character Design. Learning the process of character creation in visual form This subject will provide an intermediate level of aspects of 3D – modelling, texturing and animation techniques in Blender application. The below units would provide the skills necessary to create simple backgrounds in 3D, create & manage textures maps. The surface properties also called the shading parameters are explained. Further it continues with animation techniques.

OUTCOME OF THE COURSE:

1. Describe characteristics of well-designed and executed characters
2. Ability to generate complex models of Products with correct proportions
3. Explore biped proportions and exaggerations to create basic anima table models.
4. Understanding muscle loops to edit models to be able to animate as per joint placements
5. Ability to map 3D models in 2D UV space and adjust to suit painting needs Learning mechanics of Motion and applying principles of animation.

A. OUTLINE OF THE COURSE

UNIT NO.	TITLE OF THE UNIT	TIME REQUIRED FOR THE UNIT (HOURS)
1	Experimenting on 3D modelling Technique	13
2	3D Modelling Production pipeline	12
3	Character Modelling	15
4	Concepts of materials and textures, Introduction to UV unwrapping UV mapping.	10
5	Animation and Mechanics of motion	10

B. DETAILED SYLLABUS

UNIT	UNIT DETAILS
1.	**Experimenting on 3D modeling Technique**
	• Introduction To Modelling • Blocking, • Details,Vertex,Edges,Faces • Constructing a Good Model (the importance of quads, problem with Ngons). • Mesh optimization. • Importance of line flow. • Conclusion of Unit.
2.	**3D Modelling Production pipeline**

	● Introduction of Unit. ● Understanding Muscle flow for deformation ● Simple Assets, Props modelling ● Simple Quadruped modelling ● Understanding nature of different materials and achieving different types of ● Texture surfaces such as wood, glass, etc., ● Understanding bitmap and procedural mapping. UV layout for complex props. ● Conclusion of Unit.
3.	**Character Modelling**
	● Introduction of Unit. ● Simple Character modelling ● Hand Modelling ● Torso modelling ● Face modelling ● Clothes & Assets modelling ● Conclusion of Unit.
4.	**Concepts of materials and textures, Introduction to UV unwrapping &UV mapping.**
	● Introduction of Unit. ● Using the material Editor in Blueprints ● Procedural v/s non Procedural Textures ● 2D and 3D textures ● Using Anisotropic Shade UV Mapping ● Laying Out UVs (understanding the UV space, performing UV layout) ● Texture Mapping (creating colour map, bump and specular). ● Conclusion of Unit.
5.	**Animation and Mechanics of motion**
	● Introduction of Unit. ● Mechanics of Walking. ● Animating Walks, Gravity, Momentum & Weight. ● Timing, Arcs & Natural Motion. ● Secondary Actions, Posing, Animating with Poses. ● Following Animation Principles in 3D character animation. ● Conclusion of Unit

A. RECOMMENDED STUDY MATERIAL:

SR. NO	REFERENCE BOOK	AUTHOR	PUBLICATION
1	**Characters and Viewpoint**	**Orson Scott Card**	**Latest**
2	**Creating Characters with Personality: For Film, TV, Animation, Video Games and Graphics**	**Tom Ban Croft and Glen Keane**	**Latest**

Code: BGDCGD4102	Augmented reality and Virtual Reality	2 Credits [LTP: 2-0-0]

OBJECTIVE OF THE COURSE:

This course is designed to give historical and modern overviews and perspectives on virtual reality. It describes the fundamentals of sensation, perception, technical and engineering aspects of virtual reality systems.

COURSE: Learning Outcome

1.Describe how VR systems work and list the applications of VR Students are provided an opportunity to obtain real life experiences
2.Understand the design and implementation of the hardware that enables VR systems tube built.
3.Understand the system of human vision and its implication on perception and rendering.
4.Explain the concepts of motion and tracking in VR systems.
5.Describe the importance of interaction and audio in VR systems.

. OUTLINE OF THE COURSE

UNIT NO.	TITLE OF THE UNIT	TIME REQUIRED FOR THE UNIT (HOURS)
1	Introduction to Virtual Reality	5
2	Representing the Virtual World	5
3	The Geometry of Virtual Worlds &The Physiology of Human Vision	14
4	Development Tools and Frameworks in Virtual Reality	10
5	Augmented and Mixed Reality	14

B. DETAILED SYLLABUS

UNIT	UNIT DETAILS
1.	**Introduction to Virtual Reality**
	● Introduction of Unit ● Defining Virtual Reality, ● History of VR, Human Physiology and Perception, ● Key Elements of Virtual Reality Experience, ● Virtual Reality System, Interface to the Virtual World-Input & output- Visual, Aural & Haptic Displays, Applications of Virtual Reality. ● Conclusion of Unit
2.	**Representing the Virtual World**

	● Introduction of Unit ● Representation of the Virtual World, ● Visual Representation in VR, ● Aural Representation in VR and Haptic Representation in VR ● Conclusion of Unit
3.	**The Geometry of Virtual Worlds &The Physiology of Human Vision**
	● Introduction of Unit. ● Geometric Models, ● Changing Position and Orientation, ● Axis-Angle Representations of Rotation, ● Viewing Transformations, ● Chaining the Transformations, ● Human Eye, eye movements & implications for VR. ● Conclusion of Unit

4.	**Development Tools and Frameworks in Virtual Reality**
	● Introduction of Unit. ● Frameworks of Software Development Tools in VR. X3D Standard; ● Vega, Mutagen, Vitriol's etc. ● Application of VR in Digital Entertainment ● VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games ● Conclusion of Unit
5.	**Augmented and Mixed Reality**
	● Introduction of Unit. ● technology and features of augmented reality, ● difference between AR and VR, Challenges with AR, AR systems and functionality, Augmented reality methods, visualization techniques for augmented reality, ● wireless displays in educational augmented reality applications, ● mobile projection interfaces, marker-less tracking for augmented reality, ● Enhancing interactivity in AR environments, evaluating AR systems. ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

SR. NO	REFERENCE BOOK	AUTHOR	PUBLICATION
1	Developing Virtual Reality Applications, Foundations of Effective Design,	Craig, William Sherman and effrey Will,	2009
2	, Understanding Augmented Reality, Concepts and Applications	Morgan Kaufmann,	2013.

Code: BGDCGD4201	3D Animation for Games	1 Credits [LTP: 0-0-2]

OBJECTIVE OF THE COURSE: The Objective of this course is to help students to

- Learn the tools in creating 3D animation.
- Apply principles of animation in 3D Animation.
- Understand the 3D workflow.
- Create believable animation.
- Implement Motion and body dynamics in Animation

OUTCOME OF THE COURSE:

1. Rigging a biped character, Male/Female ready to animate.
2. Creating a character-based run cycle, jump cycle and Walk cycle with personality.
3. Will able to edit every key and motion of the animation and insert more details by just using Graph editor and Dope sheet.
4. Will be able to understand the body mechanics and weight distribution of a human body.
5. Animating an entire scene including acting for the animation.

. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	Biped Rigging	8
2	Run cycle, Jump Cycle, progressive Walk Cycle	8
3	Graph editor, Dope sheet	8
4	Weight Lifting, Pushing (Character Animation)	12

5	**Animating Scene**	**12**

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Biped Rigging**
	● Introduction of Unit ● Understanding joints and controllers ● Adding attributes, set driven key ● Blend shapes. ● Setting up Facial controls. ● Conclusion of Unit.
2.	**ın cycle, Jump Cycle, Progressive Walk Cycle**
	● Animating a Run cycle ● Animation a Jump cycle ● Progressive Walk cycle ● Run cycles, Jog, Sprint, Full Run, Jumping ● Conclusion of Unit
3.	**Graph editor, Dope sheet**
	● Extending Graph editor ● Change Rotation ● Interpolation ● Resample Curves Simplify curves. ● Concept of Dope Sheet ● Moving Keys in Dope Sheet ● Creating a Path Animation ● The Attach To Path Options Window ● Conclusion of Unit
4.	**eight Lifting, Pushing (Character Animation)**
	● Introduction of Unit ● Animating Weight lifts ● Animating Pushing ● Animating Pulling ● Conclusion of Unit
5.	**ımating Scene**
	● Rotoscopy Animation – Frame by frame ● Deciding on concept ● Acting for Animation ● Thumb nailing – gestures study ● Breaking shot wise ● Camera, scene setup ● Main Pose, Anticipation, Follow Through

	● Arcs, Graph editor ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	The ILLUSION OF LIFE: DISNEY ANIMATION	Frank Thomas	(Disney Editions Deluxe) Latest
2	Animators Survival kit	Richard Williams	Faber, Latest

Code: BGDCGD4202	Games FX	3 Credits [LTP: 2-0-2]

OBJECTIVE OF THE COURSE:

The objective is to provide a comprehensive set of 2D and 3D tools for compositing, animation, and effects that motion-graphics professionals, visual effects artists, web designers, and film and video professionals need. After Effects is widely used for digital post-production of Games, video, DVD, and the web. One can composite layers in various ways, apply and combine sophisticated visual and audio effects, and animate both objects and effects.

COURSE: Learning Outcome:

1. How to animate in After Effects to create more advanced textures
2. The fundamentals of using After Effects
3. Create practical, real world particle effects for use in your games
4. Learn the techniques for creating your own complex AAA quality effects with leading game development and motion graphics software
5. Understand how to break down complicated effects into simpler components, allowing you to adapt these techniques to any effect imaginable

. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	INTRODUCTION TO AFTER EFFECTS	5
2	ANIMATION BASICS, : WORKING WITH MASKS	5
3	PARTICLES & PAINT	14
4	BASIC COMPOSITING	10
5	INTRODUCTION TO THE 3D ENGINE, RENDERING & EXPORTING	14

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**INTRODUCTION TO AFTER EFFECTS**
	● Introduction of Unit, ● Basic Video Concepts ● Importing Files ● Project Panel Overview , Creating a New Composition ● Placing Footage in the Composition , Creating a Film Strip Effect with Multiple Movies ● Timeline Panel Overview 8. Timeline Switches, Time Ruler & Work Area ,Composition Panel Overview ● Conclusion of Unit
2.	**ANIMATION BASICS, WORKING WITH MASKS**
	● Introduction of Unit ● Exploring the Transform Properties, Introduction to Key framing, Interpolating Key frames. ● Practicing Interpolation, Copying & Pasting Key frames,. Creating a Loop ● Working with Mask Interpolation ● Using Masks for Position Key frames ● Conclusion of Unit
3.	**PARTICLES & PAINT**
	● Introduction of Unit. ● introduction to Particle Playground ● Breathing Tiger Exercise ● Introduction to Paint ● Creating an Invisible Pen Effect ● Smoke, Fire, rain, Cloud, Snowfall, Fog effects in aftereffects ● Conclusion of Unit
4.	**BASIC COMPOSITING**
	● Introduction of Unit. ● Applying Layer Blending Modes

	● Creating a Track Matte ● Keying & Key light ● Compound Effects: Gradient Wipe & Displacement Map ● Compound Effects: Wave World & Caustics ● Pre-composing & Nesting ● Conclusion of Unit
5.	**INTRODUCTION TO THE 3D ENGINE, RENDERING & EXPORTING**
	● Introduction of Unit. ● Introduction to Camera Angles & Monitor Views ● Creating 3D Text with Lights & Shadows ● Setting Up a 3D Scene , Animating a 3D Scene ● Using the Render Queue ● Working with Adobe Clip Notes ● Exporting for Flash/Unreal engine, Unity ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	An Essential Introduction to Maya Character Rigging	Briggs Cheryl	Latest
2	Understanding Rigging	Davis Larry	Latest

Code: BGDCGD4203 **Game Engine II** **2 Credits [LTP: 1-0-2]**

OBJECTIVE OF THE COURSE:

In this course, you'll be introduced to the Unreal Engine 4, a popular platform for game development and creation of cutting-edge 3D environments in real-time, video games, VR/AR, training, architectural visualization, and many other growing fields. Through a step-by-step process with videos as quick-start guides, you will become familiar with the core interface and learn how to import objects and set them up in the unreal engine. Next, you'll dive into the key skill areas of lighting, materials, and physics simulations. The course will conclude with a discussion of post processing. You'll apply these skills for everything from colour grading (next-gen film making), VFX (visual effects) or interface design (creating lines around 3D objects).

COURSE: Learning Outcome:

1. U How to build an interactive environment
2. How to import 3-D objects and from external programs
3. How to set up location-based lighting for architectural visualization
4. How to use the material editor to set up customizable materials
5. How to apply post process volumes
6. 3D environment for games development

. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	**Interface to Unreal engine**	5
2	**Mesh Types, Editor, Collisions**	5
3	**Introduction To Materials Blueprints**	14
4	**Introduction to Lighting system**	10
5	**Building a Scene**	14

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Interface to Unreal engine**
	● Introduction of Unit ● Installing Unreal Engine & Account Setup ● Overview and basic interface of unreal engine ● Unreal Engine Overview and Resources ● Editor Interface Overview ● Templates & Creating Your First Project ● View Modes & Navigation Basics ● Conclusion of Unit
2.	**Mesh Types,Editor,Collisions**
	● Introduction of Unit ● Importing Meshes Collisions ● Mesh Editor & Mesh Types ● Skeletal Mesh Editor, Static Mesh Editor ● Brief Blueprint Basics, Greyboxing ● Conclusion of Unit
3.	**Introduction To Materials Blueprints**

	● Introduction of Unit. ● Materials Overview, Shaders, Blueprints Nodes System ● Creating Your First Material ● Shading Models ● Masks Material Expressions ● Textures: Texture Map Types, Normal Maps, Roughness maps, Displacement Maps, Bump Maps. ● Conclusion of Unit
4.	**Introduction to Lighting system**
	● Introduction of Unit. ● Lighting Overview, Science, Optimization & Measurement, Lighting Design & Terminology ● Light Types, Lights Baking Lighting & Light map Resolution ● Real Time Lighting & Shadows ● Lighting Effects: IES / Light Rays / Volumetric ● External: Sun & Sky Actor Location & Time of Day, Real-Time Retracing lighting ● Conclusion of Unit
5.	**Rigid Simulations for games (Physics Intro)**
	● Introduction of Unit. ● Intro to Physics Bodies, Mass, Gravity ● Physics Forces, Motors, Forces, Constraints ● Physics Volumes, Collisions & Complexity ● Introduction to Skeletal Physics & Rag Dolls, First person ,Third Person, Fly Simulation ● Assignment to make Environment in unreal in real time lighting system with character ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Unreal Engine 4 Game Development Essentials	Satheesh Pv	Latest
2	Game Development Projects with Unreal Engine: Learn to Build Your First Games and Bring Your Ideas to Life Using UE4 and C++	David Pereira, Gonçalo Marques, and Hammad Fozi	Latest

BGDCGD4204	Exploratory IV	Credits 3(1-0-4)

Individual Project/3D/2D On Unreal Engine (Simulation of a Game design) in 3D environment

A game concept, in its simplest form, is **the easy-to-understand vision you have for your game**. It's also a way for you to sell your game idea. Your game concept should include exactly what the game is and what creating it involves. This includes the story, the art, and how you're going to make money with the game

OBJECTIVE OF THE COURSE:

In the video game industry, game design describes the creation of the content and rules of a video game. The goal of this process for the game designer is **to provide players with the opportunity to make meaningful decisions in relation to playing the game.**

OUTCOME OF THE COURSE:
To develop creativity and individuality in problem solving and performing tasks. **to prepare students to work in teams**. To prepare students to improve their skills and knowledge related to specific job positions individually. To enable students to do self-study

Project Guidelines:
Selection of an area that needs explanation in time, Select a topic that fulfils the requirements of the project, Study material on the subject done by other Gamers/ students and ensure that it is not visualized in the same manner, Comprehend the context of application, Visualize the idea in the form of a Gaming storyboard, Develop a technique to visualize, Programming, Animate the idea, Using effects, music, or voice will need discretion.

Code: BGDCGD4211	Sound Design for Games	3Credits [LTP: 1-0-4]

OBJECTIVE OF THE COURSE:

The objective is to provide a comprehensive Offering a library of sounds, instrument plugins, effects, editing, and mixing capabilities, you can use FL Studio from start to finish and create sound for games Students can use a MIDI device, import plugins and samples in almost any format.

COURSE: Learning Outcome:

- Learning how FL Studio provides students a very good and complete set of VST plugins for any style of music for games
- Understanding FL Studio course, Students will learn how to use different editing and mixing tools available in FL Studio effectively.
- Understanding Students will understand all the basic and advanced skills of this music production software to produce sounds of
- Games software.
- Explaining A gamification concept may provide an effective strategy to intensifying learning, including eliciting friendly competition among the students while making Gamified applications (projects)
- Creating a sound and music melody to deploy in game application development interact.

D. **OUTLINE OF THE COURSE**

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	FL Studio Systems and GUI Overview	5
2	Basic Settings, Pattern/Beat Sequencer & Virtual Instruments	5
3	Piano Roll & Related Tools, Playlist Editor, Audio Mixer	14
4	Side Chaining, Edison Audio Editor, Effects Automation, VST Instruments, and VST Effects	10
5	Sound and Music melody making	14

E. DETAILED SYLLABUS

Unit	Unit Details
1.	FL Studio Systems and GUI Overview

	● Introduction of Unit, ● The FL studio Interface Basics ● The windows audio setup ● Testing the inputs and outputs ● Using external interfaces with FL Studio ● Conclusion of Unit
2.	**Basic Settings, Pattern/Beat Sequencer & Virtual Instruments**
	● Introduction of Unit ● Adding plugins ● Key shortcuts ● The mixer ● Recording and editing audio ● Parametric EQ2 ● Workflow organization ● Mixer routing and sends ○ Conclusion of Unit
3.	**Piano Roll & Related Tools, Playlist Editor, Audio Mixer**
	● Introduction of Unit. ● Automation Clips ● MIDI controller mapping ● Recording Automation and the Event Editor ● Piano Roll Editing such as pattern copying ● Using scores and Midi with FPC ● Tuning kicks and drum samples in FL studio ● Mixing and effects ● The event editor ● Removing vocals from existing songs ● Creating voice tags for beats ● The piano roll ● Conclusion of Unit
4.	**Side Chaining, Edison Audio Editor, Effects Automation, VST Instruments, and VST Effects**
	● Introduction of Unit. ● Use of autogun ● Use of boo bass ● Use of harmless ● Use of morphine ● Use of harmor ● Use of sawer ● Use of ogun ● Use of samplers such as slice x ● Conclusion of Unit
5.	**Sound and Music melody making**

	● Introduction of Unit. ● Create different sounds used for games ● Create Background music for games ● Create melody for games ,wav,MP3 format ● Conclusion of Unit

F. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	The Complete Guide to FL Studio for Beginners	Aden Russell	September 9, 2021

Code: BGDCGD5101	Quality assurance for Games	2Credits [LTP: 0-0-2]

OBJECTIVE OF THE COURSE:

Testing and debugging gaming and simulation applications in the alpha and beta stages of production. Includes critiques of the product and written documentation of the testing and debugging processes. Describe the methodology and procedures for collecting, reporting, and closing game bugs; identify the stages of project completion; identify the different testing types (i.e., white box, black box, compatibility, minimum specification, etc.); explain the console approval process; and demonstrate writing precise bug database records.

COURSE: Learning Outcome

1. Principles are reinforced through project-based assignments.
2. Students are provided an opportunity to obtain real life experiences

3. Practicing professionals may upgrade their job skills.
4. student will have developed communication skills that will be useful in any industry or endeavor
5. requirements of an entry-level quality assurance tester in the video game industry

. **OUTLINE OF THE COURSE**

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	Intro to course and to QA. Intro to Test Cases.	5
2	Game development teams and Test Suites.	5
3	Play Balance Testing, ad hoc testing, player type combo testing.	14
4	Pre-Production Phase of game development. The back-and-forth of bug reporting.	10
5	Quality Appraisal. Testing social games, localization testing	14

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Intro to course and to QA. Intro to Test Cases.**
	● Introduction of Unit ● Historical Background, Rules of Testing, Bare Bones Bug Hunting ● Why Testing is Important, FACT-BADI ● Being a Game Tester, Identifying Bugs, Piano TV ● Bugs in game ● Different Department of game QA in companies ● Conclusion of Unit
2.	**Game development teams and Test Suites.**
	● Introduction of Unit ● Game Team Overview ● Game Production Cycle ● Test Phases ● Testing Game Life Cycle ● Bug Categories ● Conclusion of Unit
3.	**Play Balance Testing, ad hoc testing, player type combo testing.**
	● Introduction of Unit. ● Software Quality, Appraisal Documents, Quality Plans ● Overview of the Test Process, Lifecycle of a Build, ● Black box/White box, Testing by Numbers ● Testing Techniques - Test Trees ● Testing Techniques - Combinatorial Testing ● Conclusion of Unit
4.	**Testing Techniques**
	● Introduction of Unit. ● Cleanroom Testing, Modeling Player Behavior. ● Play testing and Ad-hoc Testing

	● Defect Triggers ● Conclusion of Unit
5.	**Testing Classification ,Track, referencing, scripting,**
	● Introduction of Unit. ● Test Flow Diagrams. ● Publisher-developer relationship in game development ● Aftermarket Phase of game development. ● Elite Bug Hunting ● Entering Game Testing, Transcending Testing, Working Conditions and Demographics ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Principle and practice for Quality Assurance	Stanley Bernard Brahams	Latest
2	Quality Assurancefor Games	David Holmes	Latest

Code: BGDCGD5102	Research for Gaming	2Credits [LTP: 2-0-0]

OBJECTIVE OF THE COURSE:

This course enables the students to: Make student learn the process of research in context of multimedia and games
Become aware of the major researches taken place so far in the domains of Digital Games and Multimedia
Gives the basic knowledge about the process of research relevant for animation and multimedia professional.

COURSE: Learning Outcome:

1. Develop the skills to conduct a successful research required to conduct any project or develop strategies in today's competitive environment
2. Write a research paper.
3. Can take up research as a career or further study (Masters and PhD)
4. Implement skills of conducting research in his / her job (projects)
5. Will learn to do documentation and presentation of research content

. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	INTRODUCTION TO RESEARCH	5
2	RESEARCH METHODS	5
3	RESEARCH METHODS APPROACHES	14
4	TYPES OF RESEARCHES	10
5	WRITING RESEARCH PAPER	14

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**INTRODUCTION TO RESEARCH**
	● Introduction of Unit, ● Basics Concepts about Research: ● Research Process: ● Major Types of Research: ● How to Review the Literature Review and Conduct Ethical Studies: ● Conclusion of Unit
2.	**RESEARCH METHODS**
	● Introduction of Unit. ● Strategies of Research Design, ● Qualitative and Quantitative Sampling, ● Qualitative and Quantitative Measurement, ● Analysis of Quantitative Data, ● Analysis of Qualitative Data ● Conclusion of Unit
3.	**RESEARCH METHODS APPROACHES**
	● Qualitative Approaches for Studying Games: Game Play Analysis, Games and information ● Qualitative Approaches for Studying Play and Player: Ethnography, In-depth interviews, Studying thoughts ● Focus Group Discussion ● Field Research and Focus Group Research
4.	**TYPES OF RESEARCHES**
	● Introduction of Unit. ● Experimental Research: ● Survey Research: ● Writing the Research Report and the Politics of Social Research: ● Conclusion of Unit

5.	WRITING RESEARCH PAPER
	● Introduction of Unit. ● Study of Various Research Papers ● Project: Research Paper Writing ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Game Research Methods	Petri Lankoski and Staffan Bjork (2018)	(2018)
2	Social Research Methods	W. Lawrence Neuman	(2014)

Code: BGDCGD5201	Advance Game Engine	3Credits [LTP: 2-0-2]

OBJECTIVE OF THE COURSE:

This Advance course introduces the games development and elements of software engineering of games. The includes a review of games development approaches and their applications. We will concern on three main topics: the determining and modelling of a game user, software engineering of games for modern platforms, and game development and programming.

COURSE: Learning Outcome:

- Ability to design a game within realistic constraints such as economics, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- Ability to use development techniques, skills, and tools necessary for games development practice
- Ability to design, validate, implement, and maintain games
- Ability to communicate effectively
- Ability to use development techniques, skills, and tools necessary for games development practice

D. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	Level design and content pipeline	5
2	Software architecture design patterns in games	5
3	Developing Artificial Intelligence (AI) in games.	14
4	Optimizing and Debugging	10
5	Game testing and analytics	14

E. DETAILED SYLLABUS

Unit	Unit Details
1.	**Level design and content pipeline**
	● Introduction of Unit, ● What is level design, ● Interconnections between content and a game's world. ● Level design. Worlds and levels understanding. ● Level design patterns. Content asset types. Editor-Created assets. ● External Content development standards. ● Blueprints visual scripting, workflow, game programming, and framework overview. ● The Event Graph, Game loops, call in Editor, debugging. ● Conclusion of Unit
2.	**Software architecture design patterns in games**
	● Introduction of Unit. ● Games architectural/programming patterns. Blueprint Character, Components, Animations. ● Game users and their classifications. Player motivation. Human psychophysiological characteristics. ● Perception and cognitive biases. Goal setting and motivation. Gamification, game progress, experience, and achievements. ● Symbolic systems and applied semiotics. Internationalization and localization problems.

	● Behavior and interaction patterns. Education and re-education. User-oriented design principles. Classes in Blueprints. ● Gameplay framework utilization in UE4. Collisions, objects interaction. ● Conclusion of Unit
3.	**Developing Artificial Intelligence (AI) in games.**
	● Introduction of Unit ● AI in games. Levels of AI in games. Non-Player Character (NPC), NPC programming in EU4, Behavior tree, AI Perception, Pawn Sensing, and EQS. ● User cantered design. UI/UX. Interaction patterns. HUD Types. Unreal Motion Graphics UI Designer. Key widget types. ● Common panel Types. UI Focus. Animation ● Conclusion of Unit
4.	**Optimizing and Debugging**
	● Introduction of Unit. ● Gameplay debugging, Blueprint debugging. Optimization ● User cantered design. UI/UX. Interaction patterns. HUD Types. Unreal Motion Graphics UI Designer. Key widget types. Common panel Types. UI Focus. Animation ● Conclusion of Unit
5.	**Game testing and analytics**
	● Introduction of Unit. ● Game difficulty and balance, in-games metrics. Game testing overview. ● Requirements management in game dev. Game design documentation. Deployment Process in UE4. Packaging Configurations in UE4. Distribution and deployment. Developing as a Team, development methodologies, truck factor, burnout and crunch, source control. Shipping and releasing. Games marketing ● Gameplay Ability System in UE4 ● Extending C++ into Blueprints. [optional] Reflection, threads. ● Conclusion of Unit

F. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Advance Unreal Engine Book	Petri Lankoski and Staffan Bjork (2018)	(2018)

Code: BGDCGD5202	Advance **AR-VR Studio**	Credits: 3 [LTP: 1 -0-4]

OBJECTIVE OF THE COURSE:

The purpose of this subject is to provide the students with methodologies and specific industry skills that will assist them in identifying issues and creating design solutions with emphasis on augmented reality and Virtual reality. The students will receive information that will enable them to:

- To understand AR & VR ecosystem
- To examine process set up in AR & VR
- To Understand Interactive Techniques in Virtual Reality
- To discuss assets development in AR &VR
- To identify process of a build in an AR& VR app
- To create a simple AR & VR app

OUTCOME OF THE COURSE:

1. The subject aims to impart knowledge of Introduction of AR& VR technology
2. To understand the development of Setting Up Projects
3. To be able to develop Assets
4. To be able to build Apps
5. To create an Augmented Business Card
6. To Create Application of VR in Digital Entertainment

. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	Introduction of AR & VR Technology	6
2	Setting Up Project for AR & VR	6
3	Assets Development For AR&VR	6
4	Building App AR & VR	10
5	Augmented Business Card & VR Environment	8

B. DETAILED SYLLABUS

Unit	Unit Details
1	Introduction of AR & VR Technology

	● Introduction of Unit ● Overview of AR, AR vs. VR, how AR works, Different types of AR , AR targets, types of AR for Marketers – Marker Based – Marker less – Layer / Goggles , Applications of AR, technical issues ● Fundamental Concept and Components of Virtual Reality, Real time computer graphics, Flight Simulation, Virtual environment requirement, benefits of virtual reality, Historical development of VR, The Virtual world space, positioning the virtual observer, the perspective projection, human vision, stereo perspective projection, 3D clipping, Color theory, Simple 3D modelling, Illumination models, Reflection models, Shading algorithms, Radiosity, Hidden Surface Removal, Realism Stereographic image. ● Conclusion of Unit
2	**Setting Up Project for AR & VR**
	● Introduction of Unit ● AR: Install unity, Vuforia package, Android SDK, Vuforia developer portal account, using Camera in AR, placing a object, inspector setup – create a button. – Develop – Vuforia - License manager – get development key –target manager – add database setup. ● VR : developing in Unity, consider using VRTK (Virtual Reality Toolkit), Birds-eye view, Locomotion, Manipulation ,System control, Auditory perception, Auditory localization, Depth perception , Depth perception, Motion perception, Photoreceptor, Sufficient resolution for VR ,Light intensity, Eye movements ● Conclusion of Unit
3	**Assets Development For AR&VR**
	● Introduction of Unit ● **AR: UI,** Videos, **3D** Model - Character – Vehicles – Alien – Environment - props, Texturing, Rigging, and Animation - Walk – jump – dance – run, file formats. ● **VR** : Geometric modelling ,Transforming models, Matrix algebra and 2D rotations , 3D rotations and yaw, pitch, and roll , 3D rotations and yaw, pitch, and roll, coned , Axis-angle representations ,Quaternions , Converting and multiplying rotations , Converting and multiplying rotations, coned , Homogeneous transforms , The chain of viewing transforms , Eye transforms , Eye transforms, coned , Canonical view transform , Viewport transform , Viewport transform, coned ● Conclusion of Unit
4	**Building App AR & VR**
	● Introduction, Identifying platform and toolkits, Vuforia – dataset setup, integration in unity, UI interactions, unity setup, image target, touch controls, player settings, Switch platform and build ask. ● Set up your development environment, Download the Google VR SDK for Unity, Import the Google VR Unity package, Configure settings, Preview the demo scene in Unity, Prepare your device., Build and run the demo scene on your device, Next steps. ● Conclusion of Unit
5	**Augmented Business Card & VR Environment**
	● Introduction to Unit ● Planning AR development, setting up the project(Vuforia), Adding the image target, Adding objects, Animate the object, object setup in unity, Build the APK. ● Planning VR development SDKs and frameworks, debugging and profiling, Gaze-based triggers, controller tracking,locomotion,implementing object manipulation, optimizing text and UI for VR ● Conclusion of Unit

C. RECOMMENDED STUDY MATERIAL:

Sr.No	Reference Book	Author	Publication

1	Augmented Reality for Developers: Build practical augmented reality applications with Unity, ARCore, ARK it, and Vuforia	Jonathan Linowes (Author), Krystian Babilinski (Author)	Packt Publishing; 1 edition (October 9, 2017) - ASIN: B075V9XJ3Z.
2	Unity 2018 Augmented Reality Projects: Build four immersive and fun AR applications using ARkit, ARCore, and Vuforia	Jesse Glover (Author)	Packt Publishing - ebooks Account (July 30, 2018) - ISBN-10: 9781788838764,ISBN-13: 978-1788838764.
3	Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR (Usability)	1st Edition - by Steve Aukstakalnis (Author) - Addison-Wesley Professional	1 edition (September 18, 2016) - ISBN-10: 0134094239, ISBN-13: 978-0134094236

Code: BSBESB5203	**Advanced VFX Compositing**	**2 Credits [LTP: 0-0-4]**

Course Objectives:

- Obtain knowledge in render pass/channel management and bit depth allocation
- Understand LUT and its application in colour correction for compositing
- Learn the application of external plugins for various purposes
- Ability to work with detailed in-depth composites, concepts and techniques for advanced VFX shots
- Identify the application of 3d compositing, projection mapping and tracking.

Course Outcome:

- Discover the significance of Render passes and channel management
- Application of LUT and elements for colour correction.
- Appraise the strategies for advanced techniques for in-depth compositing
- Analyse the significance of external plugins and their implementations
- Composing with 3d layers and application of tracking & projection mapping

OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	**Passes for Compositing**	**34**
2	**Rotoscopy, Painting and LUT**	**34**
3	**Advanced Compositing**	**38**
4	**Working in 3D**	**38**
5	**Tracking and Match moving**	**36**

. **DETAILED SYLLABUS**

Unit	Unit Details
1.	**Passes for Compositing**
	● Introduction to the Unit ● Pass Management, Bit Depth Allocation, Finding The Best Depth Channels, Color Channels for the Project ● Conclusion to the Unit
2.	**Rotoscopy, Painting and LUT**
	● Introduction to the Unit ● The LUT use and Specifications, Finding the Black's and White's, Node reusing to Maintain Color Correction, Use of Plugin's in 3D Channels ● Short film project using Rotoscopy, Painting and compositing [Group or Individual] ● Conclusion to the Unit
3.	**Advanced Compositing**
	● Introduction to the Unit ● Advanced In-Depth Compositing, Concepts and Techniques to Compositing Foliage, Learn to Composite Hair and Fur, Creating and Merging Horizon Lines, Using Vector Blur For Quicker Results ● Short film project using Matchmoving and CG Compositing [Group or Individual] ● Conclusion to the Unit.
4.	**Working in 3D**
	● Introduction to the Unit ● Creating Macro's and Dummies, 3D Layers / Nodes in Brief, 3D Camera Projection and Tracking, 3D Channels and Depth Creation, RGB Mattes and Rotoscopy Solutions. ● Conclusion to the Unit
5.	**Tracking and Matchmoving**
	● Introduction to the Unit ● Short film project using Tracking and Matchmoving [Group or Individual] ● Conclusion to the Unit

RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	[digital] Visual Effects and Compositing	Jon Gress	New Riders, 2014
2	The Art and Science of Digital Compositing	Ron Brinkmann	Morgan Kaufmann; 2 edition (24 May 2008)

Code: BGDCGD5204	Exploratory V	3 Credits [LTP: 1-0-4]

Individual Project2D/3D Game Design with Motion capture technology and Unity Engine

A game concept, in its simplest form, is **the easy-to-understand vision you have for your game**. It's also a way for you to sell your game idea. Your game concept should include exactly what the game is and what creating it involves. This includes the story, the art, and how you're going to make money with the game

OBJECTIVE OF THE COURSE:

In the video game industry, game design describes the creation of the content and rules of a video game. The goal of this process for the game designer is **to provide players with the opportunity to make meaningful decisions in relation to playing the game.**

OUTCOME OF THE COURSE:
To develop creativity and individuality in problem solving and performing tasks. **to prepare students to work in teams**. to prepare students to improve their skills and knowledge related to specific job positions individually. to enable students to do self-study.

Project Guidelines:
Selection of an area that needs explanation in time, Select a topic that fulfils the requirements of the project, Study material on the subject done by other Gamers/ students and ensure that it is not visualized in the same manner, Comprehend the context of application, Visualize the idea in the form of a Gaming storyboard, Develop a technique to visualize, Programming, Animate the idea, Using effects, music, or voice will need discretion.

Code: BGDCGD5211	Advanced Programming in C++ Lab	2 Credits [LTP: 0-0-4]

OBJECTIVE OF THE COURSE: This is an introductory programming subject using the C# language. It does not assume any prior programming experience. This course will prepare students for intermediate C# and ASP.NET courses for games. This is an optional course in the Local Area Network Administration and Microcomputer Applications Support AAS degrees, and in the Local Area Network Administration and Database Certificates.

COURSE: Learning Outcome:

1. Recognize, diagram, and implement introductory programming concepts using C#
2. Able to make the blueprints in unreal engine with the help of c# language
3. Determine logical alternatives with C# decision structures utilizing iteration, class methods, fields, and properties.
4. Assemble forms, classes, and controls into C# solutions utilizing arrays and file/database access methods

G. OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1	NET Framework 4.0	5
2	Object Oriented Programming with C#	5
3	C# Advanced Features	14
4	Multithreading, Exploring .Net Assembly	10
5	Creating a User Interface Application by Using Standard Controls	14

H. DETAILED SYLLABUS

Unit	Unit Details
1.	**NET Framework 4.0**
	● Introduction of Unit, ● Framework Architecture ● Common Language Runtime ● Garbage Collection and MSIL ● Conclusion of Unit
2.	**RESEARCH METHODS**

	● Introduction of Unit. ● OOPs Concepts ● Partial Classes and Partial Methods ● Managing Types, Properties ● Methods and Parameters ● Named Parameters and Optional Parameters ● String Handling ● Abstract Classes and Interfaces ● The Exception Handling in .Net 4.0 ● Conclusion of Unit
3.	**C# Advanced Features**
	● Introduction of Unit. ● Delegates and Events ● Attributes ● Familiarizing Collections and Generics ● Language Integrated Query (LINQ) ● Object and Collection Initializes ● Query Expressions ● Navigating the File System ● Reading and writing files , Compressing Streams ,Forming regular expressions , Encoding Serializing Objects ● Conclusion of Unit
4.	**Multithreading, Exploring .Net Assembly**
	● Introduction of Unit. ● Creating Threads ● Managing Thread class ● Classification of Assembly ● Private Assembly and Shared Assembly ● The Global Assembly Cache ● Single File Assembly and Multiple File Assembly ● Understanding Reflection ● Creating and Managing Application Domains ● Conclusion of Unit
5.	**Creating a User Interface Application by Using Standard Controls**
	● Introduction of Unit. ● Add and configure a Windows Form. ● Manage control layout on a Windows Form. ● Managing Form-Properties ● Add and configure a Windows Forms control. ● Create and configure menus. ● Create event handlers for Windows Forms and controls

	● Construct Print documents ● Create a customized Print Preview component ● Implement Globalization and Localization for a windows application ● Implement accessibility Features ● Create and configure MDI forms ● Drag and Drop functionality in C sharp ● Create a User control in c sharp , Create a composite windows forms control , Create an extended control by inheriting from existing windows control ● Managing XML ● Designing and Implementing Databases with SQL Server 2008 ● WPF Application Fundamentals ● Conclusion of Unit

I. RECOMMENDED STUDY MATERIAL:

Sr. No	Reference Book	Author	Publication
1	Programming In C#	E. Balagurusamy	(2017)
2	The Ultimate guide to learn C# Language	Ryan Turner	(2019)

Code: BGDCGD5601 **Discipline and Talent Enrichment Programme (TEP)-I 1 Credits [LTP: 0-0-0]**

OBJECTIVE OF THE COURSE:
The objective of Discipline and TEP is to provide students with the opportunities to enhance job fetching skills and at the same time to cultivate the student's personal interests and hobbies while maintaining the good disciplinary environment in the University. TEP is integrated into the curriculum for holistic development of students through active participation in various activities falling in Technical and non-technical categories.

Discipline and Talent Enrichment Programme (TEP) –I shall be evaluated irrespective of period/time allocation (as in the case of Extra Curricular activity) in the teaching scheme as a TWO credit course. The record related to discipline and related activities are maintained for each student and they shall be evaluated for the same also. It shall be counted in calculation of SGPA but it is not a backlog subject. However, the attendance of these classes shall be recorded and accounted in the total attendance.

Activities included in this category in the Third Semester are as follows:

Code	Activity	Hours	Credits
BSB01609.1	Campus Recruitment Training (CRT)- INTRODUCTION TO COMMUNICATION SKILLS	2	
BSB01609.2	Library	1	

			1

Code: BGDCGD6601	Internship	6 Credits [LTP: 0-0-12]

OVERVIEW AND OBJECTIVES:

To provide an opportunity to the student to explore the ideas for Animation short. To impart skills in developing a story and script. To provide opportunity in designing the characters, Layouts. To impart skills in Animatic
To provide opportunity to visualize the concepts in any media chosen such as 2D / 3D to provide knowledge in production of the assets in 2D / 3D like Characters, Layouts etc. To provide knowledge in Rigging, Animation
To provide knowledge in designing the sounds for the Animation
To provide knowledge in Lighting the scenes, and Rendering the scenes

PART I
Part one will consist of all **Pre-production** for the short animated film.
Students are expected to take up an independent study and production of a Short Animated Film. The film may be 2 – 5 minutes in duration. The project may be done independently or in a group not larger than 4-5 members. The project must be well researched with adequate time spent on information collection, a thorough documentation of all the sources with appropriate credits provided for the information from books, websites, people, organizations etc.

The project must be a culmination of all learning through the semesters and must be seen as an opportunity to converge and cohesively bring both conceptual and craft skills together in the film.
The student/s is expected to demonstrate sensitivity to content, cultures, and people and take the responsibility for the content being conveyed through the film.

The film must be a clear indication of the maturity, responsibility and concern the student is capable of demonstrating.

1. This must be conveyed through the content in the film
2. Concept and craft skills
3. Imagination and innovation
4. Execution of the product with professionalism
5. Time frames and deadlines
6. Contact with teachers during the project
7. Ability to be a team player and leader
8. Integrity of the product in terms of credits and following copyright laws
9. Documentation of the process and presentation of the final film
10. Ability to articulate, communicate and present the project

PART II
Part two will consist of all **Production** and **Post-production** for the short animated film. Students are expected to take up an independent study and production of a Short Animated Film. The film may be 2 – 5 minutes in duration. The project may be done independently or in a group not larger than 6 members. The project must be well researched with adequate time spent on information collection, a thorough documentation of all the sources with appropriate credits provided for the information from books, websites, people, organizations etc…
The project must be a culmination of all learning through the semesters and must be seen as an opportunity to converge and cohesively bring both conceptual and craft skills together in the film.
The student/s is expected to demonstrate sensitivity to content, cultures, and people and take the responsibility for the content being conveyed through the film.
The film must be a clear indication of the maturity, responsibility and concern the student is capable of demonstrating

- This must be conveyed through the content in the film
- Concept and craft skills
- Imagination and innovation
- Execution of the product with professionalism
- Time frames and deadlines
- Contact with teachers during the project
- Ability to be a team player and leader
- Integrity of the product in terms of credits and following copyright laws
- Documentation of the process and presentation of the final film

- Ability to articulate, communicate and present the project

ALL students must submit a show reel. It is a mandatory part of the final degree submission. If any student fails to submit her/his show reel, the final submission will be considered incomplete and will have to follow the rules as applicable. The final degree project will be considered incomplete and a decision of the jury will be final under such circumstances.

PROJECT GUIDELINES

1. A film (short) shall be done using animation as medium, Animation medium includes the following :
1. Traditional
2. Digital
3. Contemporary
4. Mixed media

2. Each story has to be guided by faculty from the respective centre.
3. Duration of the films (short) should not be less than 2 minutes and more than minutes in length
4. The above mentioned length of film is not inclusive of title and end credits
5. The length of credits should not exceed 10 % of the total length of the film.
6. The film will be considered as complete only if it contains title cards – film itself (fully lit and rendered)-end credit titles, all with music.
7. The film can have a three act structure or it can be a single act or just a visual gag.
8. The content of the film should not have any material in it which is socially insensitive.
9. The suggestion is that only a maximum of 3 characters be used in the story due time constraints and that would be irrespective of the length of the film.
10. If you are using CG as the medium for creating your film; the film should not have more than 1, 00,000 poly count in any shot composition and the per character poly count should not exceed 10,000.
11. Avoid scenes like these in 3D animation - dense forests, populated areas, (high end dynamics, water, cloth, fur and hair based simulations).
12. The final must happen at 25 FPS.
13. Follow the video safe area.
14. The Final output resolution must only be of 720x576 PAL (use letterboxing for widescreen presentation)
15. The final output should be an MPEG2/MOV.
16. The File size of the finished film should not exceed 200MB/ minute.

Group:

- For the execution of the project, the class shall be divided into groups/teams of students.
- Each Group should not have more than 6 individuals and not less than 4 individuals.
- Make sure all skill sets are available within the team.
- If any member of the group is not observed participating and fulfilling his assigned areas, with due commitment, the rest of the group can decide against having his/her name in the credits.

Group In charge/Team Mentor

- One Faculty for each group can be a Team Mentor and responsible for final output.
- Team Mentor should assign the jobs to the students, fix deadlines and do quality check at various intervals
- Team Mentor should also manage the pipeline, for which he/she can appoint one student for his assistance.