



Karmaveer Bhaurao Patil University, Satara

Syllabus for
B. Sc. III Animation Science

Under
Faculty of Science and Technology
(As per NEP 2020)

With effect from Academic Year 2026-27

Syllabus for Bachelor of Science (B.Sc.) Part - III Animation Science

PREAMBLE:

The B.Sc. Part III (Animation Science) programme, introduced in the academic year 2026–27 is designed in accordance with the National Education Policy (NEP) 2020 to develop creative, technically skilled and industry-ready professionals for the animation, multimedia, gaming and Information Technology (IT) sectors. The curriculum integrates visual arts, computing, digital technologies and scientific principles to provide students with a strong foundation in animation, digital graphics, programming, design and emerging technologies.

The programme follows a progressive learning approach, where students build core competencies in the first year and gradually advance to specialized domains such as 2D/3D animation, visual effects (VFX), game development, UI/UX design, Augmented Reality (AR), Virtual Reality (VR), Artificial Intelligence (AI) and real-time digital content production. It emphasizes experiential learning through project-based activities, industry-standard software, internships, on-job training (OJT), community engagement, and collaborative learning to enhance technical expertise and professional skills.

The curriculum also provides exposure to emerging technologies, including AI-assisted content creation, prompt-based filmmaking, drone cinematography, and immersive media, enabling students to adapt to the evolving digital landscape. The programme prepares graduates for careers in animation studios, IT companies, gaming, film and television, advertising, digital media, startups and entrepreneurship while fostering innovation, ethical practices, professionalism and lifelong learning.

1. TITLE: Animation Science
2. YEAR OF IMPLEMENTATION: From 2026-2027
3. DURATION: 01 Year
4. PATTERN: Semester
5. MEDIUM OF INSTRUCTION: English
6. PRACTICAL BATCH: 12 Students/Batch

7. STRUCTURE OF COURSE:
As per NEP-2020 (2.0)

Sem (Level)	Courses		VSC/SEC	AEC/VEC/ IKS	OJT/FP/ CEP/CC/ RP	Total Credits	Degree/ Cum. Cr. MEME
	Course I	Course II					
	Major Mandatory	Major Elective					UG Degree 132
Sem V (5.5)	Major IX (2) Major X (2) Major XI (2) Major P V (2)	Major XII (Elect.) (2) Major P VI (Elect.) (2)	VSC III (2) (P) Major Specific	AEC III (2) (English)	OJT (4) CEP (2)	22	
Sem VI (5.5)	Major XIII (2) Major XIV (2) Major XV (2) Major P VII (2)	Major XVI (Elect.) (2) Major P VIII (Elect.) (2)	VSC IV (2) (P) Major Specific SEC III (2) (P)	AEC IV (2) (English)	FP (2) CC (2)	22	
Credits	16	08	06	04	10	44	
Total	48	24	14	16	10	132	Exit Option

DSE - 2 Papers out of four for each semester

7.COURSE TITLE

Semester V

Semester V				
Sr. No.	Components	Course Code	Course	Credits
1	Major IX	BAST 351	2D Game Design	02
2	Major X	BAST 352	3D Maya Modeling and Texturing	02
3	Major XI	BAST 353	UI /UX	02
4	Major Electives XII	BAST 354 E-I	E- commerce	02
		BAST 355 E-II	Market research	
5	Major Practical V	BASP 356	Major Practical -V BASP 356 2D Game Design + 3D Maya Modeling and Texturing (Based on BAST 351+BAST 352)	02
6	Major Elective Practical VI	BASP 357	Major Elective Practical -VI BASP 357 UI /UX+ E-commerce/ Market research (Based on BAST 353+BAST 354 E-I/ BAST 354 E-II)	02
7	VSC	BASPVSC III	3D Maya Rigging	02
8	AEC	BASTAEC III	English	02
9	OJT	BASPOJT I	On Job Training	04
10	CEP	BASPCEP I	Community Engagement Programme	02
Total				22

DSC: Discipline Specific Course; **DSE:** Discipline Specific Elective **VSC:** Vocational Skill Course; **AEC:** Ability Enhancement Course, **OJT:** On Job Training, **FP:** Field Project, **CEP:** Community Engagement Program, **T:** Theory, **P:** Practical

Semester VI

Semester VI				
Sr. No	Components	Course Code	Course	Credits
1	Major XIII	BAST 361	3D Game Design	02
2	Major XIV	BAST 362	VFX	02
3	Major XV	BAST 363	Dynamics and Rendering	02
4	Major Electives XVI	BAST 364 E-I	AR for Animation	02
		BAST 365 E-II	VR for Animation	
5	Major Practical VII	BASP 366	Major Practical -VII BASP 366 3D Game Design + VFX (Based on BAST 361 + BAST 362)	02
6	Major Elective Practical VIII	BASP 367	Major Elective Practical-VIII BASP 367 Dynamics and Rendering + AR for Animation / VR for Animation Based on BAST 363+BAST 364 E-I/ BAST 364 E-II	02
7	VSC	BASPVSC IV	Rotoscoping	02
8	SEC	BASPSEC III	Maya Character Animation	02
9	FP	BASFPFP I	Field Project in Animation Science	02
10	CC	BASTCC I	Co-curricular Course in Animation Science	02
11	AEC	BASTAEC IV	English	02
Total				22
EXIT OPTION: Award of UG Degree in Major with 132 credits OR Continue with Major & Minor.				

DSC: Discipline Specific Course; **DSE:** Discipline Specific Elective **VSC:** Vocational Skill Course; **AEC:** Ability Enhancement Course, **OJT:** On Job Training, **FP:** Field Project, **CC:** Co-Curricular, **CEP:** Community Engagement Program, **T:** Theory, **P:** Practical

8. EVALUATION STRUCTURE:

1. Semester V (5.5)

Vertical	Course Category	Course Code	Internal Evaluation Best of 2 from CCE I, II & III Selected for final Score			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
DSC	T	BAST 351	10	10	10	30	50	02
	T	BAST352	10	10	10	30	50	02
	T	BAST353	10	10	10	30	50	02
	P	BASP356	20			30	50	02
DSE (1 Theory Papers Out of 2)	T	BAST354	10	10	10	30	50	02
	T	BAST355	10	10	10	30	50	02
	P	BASP357	20			30	50	02
AEC	T	AEC III	10	10	10	30	50	02
VSC	P	BASPVSC III	20			30	50	02
CEP	P	BASPCEP I	20			30	50	02
OJT	P	BASPOJT I	40			60	100	04
Total							550	22

2. Semester VI (5.5)

Vertical	Course Category	Course Code	Internal Evaluation Best of 2 from CCE I, II & III Selected for final Score			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
DSC	T	BAST361	10	10	10	30	50	02
	T	BAST362	10	10	10	30	50	02
	T	BAST363	10	10	10	30	50	02
	P	BASP366	20			30	50	02
DSE (1 Theory Papers Out of 2)	T	BAST364	10	10	10	30	50	02
	T	BAST365	10	10	10	30	50	02
	P	BASP367	20			30	50	02
AEC	T	AEC IV	10	10	10	30	50	02
VSC	P	BASPVSC IV	20			30	50	02
SEC	P	BASPSEC III	20			30	50	02
CC	T	BASTCC I	10	10	10	30	50	02
FP	P	BASPFP I	20			30	50	02
Total							550	22

Abbreviations: DSC: Discipline Specific Course; DSE: Discipline Specific Elective; CCE: Continuous Comprehensive Examination; AEC: Ability Enhancement Course; VSC: Vocational Skill Course; SEC: Skill Enhancement Course; OJT: On Job Training; FP: Field Project; CEP: Community Engagement Program; CC: Co-curricular Course; T: Theory; P: Practical, ESE: End Semester Examination

INTERNAL EVALUATION STRUCTURE

- Internal evaluation of theory papers shall carry a weightage of 40%.
- Activity: For the internal evaluation of theory papers following activities will be adopted for CCE I & CCE II: class test/ open book test/ online course/ Industrial review/ Industrial visit/ e learning video creation/ assignment/seminar/ case study/ fieldwork/ project.
- CCE III shall consist of multiple-choice questions.
- Each CCE will carry 10 marks for 2-credit theory papers and 20 marks for 4-credit theory papers, and the best two scores will be considered for final score.
- Internal evaluation of practical papers shall carry a weightage of 40%.
- For practical examinations, internal evaluation will be based on student performance, attendance, journal records, and viva voce.



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Faculty of Science & Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - V

Type: DSC IX

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: 2D Game Design (BAST 351)

Course Objectives: Student should be able to...

1. understand the Unity interface and 2D game development environment.
2. differentiate between Rigidbody2D and Collider2D components.
3. use Unity tools to create 2D game elements.
4. relate interactive menus, buttons and HUD elements.

Course Outcomes: Students will be able to...

1. explain Unity game objects, physics and user input.
2. analyze the relationship between Unity components.
3. develop a basic 2D game level using Tilemap and Sprites.
4. design a complete 2D game in Unity.

Module	Title and Contents	Hrs.
Module-1	2D in Unity 1.1 Introduction to 2D games, 2D graphics, 2D physics, game development, project setting for 2D games. 1.2 2D game creation workflow, Unity Editor interface, toolbar, manipulating objects. 1.3 Unity projects, Assets and scene, fundamentals, scripting, sprites. 1.4 Building in-game environment, character animation, graphics, audio.	08
Module-2	Fundamentals of games 2.1 Scenes, painting levels, level testing, GameObjects, Prefabs, sprite Renderer. 2.2 Collider 2D, Importing and setting up Sprites, Sprite Atlas, 9-slicing, Tilemap, 2D Tilemap Extras, Isometric Tilemaps. 2.3 Sprite Shape Character animation, Frame-by-frame, Cutout, Skeletal. 2.4 Lighting, Shadows, Particle systems, post-processing.	07
Module-3	Sprites and Tilemaps 3.1 Rigid body 2D, Collider 2D, Triggers, 2D Joints, 2D Effectors, Audio. 3.2 2D game perspectives, reference, 2D game art style reference, Image. 3.3 import as sprites, Sprites sorting order, Sprite renderer, Placeholder sprites, sprite editor, custom outline, custom physics shapes. 3.4 tilemaps in unity, working with tilemaps, hexagonal tilemaps, isometric tilemaps.	08
Module-4	Publishing 4.1 2D renderer sorting, Overview, Transparent Queue Sorting Order by Priority. 4.2 Sorting Layer and Order in Layer, Specify Render Queue, Distance to Camera. 4.3 Rendering pipeline, post-processing and full-screen effects, color, and Graphics performance and profiling. 4.4 Platform development, Cross-platform features and considerations.	07

Reference Books: -

1. H. Ferrone. Learning C# by Developing Games with Unity. 7th ed. Birmingham, UK: Packt Publishing, 2023.
2. F. Lanzinger. 2D Game Development with Unity. Boca Raton, FL: CRC Press, 2020.
3. J. Murray. Game Development with Unity: Create Your First 2D Game from Scratch. New York: Apress, 2020.
4. J. Halpern. Developing 2D Games with Unity: Independent Game Programming with C#. Berkeley, CA: Apress, 2018.
5. A. Godbold and S. Jackson. Mastering Unity 2D Game Development. Birmingham, UK: Packt Publishing, 2016.

Evaluation Pattern (40:60)**Total Marks: 50****Internal Continuous Evaluation (20 Marks):**

- CCE - I: 10 Marks
- CCE - II: 10 Marks
- CCE - III: 10 Marks

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions
(5 questions of 2 Marks)
 - Question -2: Attempt any two out of three questions
(3 questions of 10 marks)
 - Question -3: Attempt any four out of Six questions
(6 questions of 05 marks)
- (50 Marks Converted into 30 Marks)**



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Faculty of Science & Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - V

Type: DSC X

Marks: 50

Credits: 2

From: A. Y. 2026-27

**Name of the Course and code: 3D Maya Modeling and Texturing
(BAST 352)**

Course Objectives: Student should be able to...

1. identify the Maya interface and essential modeling tools.
2. explain fundamental concepts of 3D modeling and topology.
3. apply polygonal and NURBS modeling techniques to develop 3D assets.
4. analyze UV layouts, edge flow and surface continuity for texturing.

Course Outcomes: Students will be able to...

1. develop Maya tools for efficient modeling and texturing workflows.
2. illustrate appropriate topology and edge-flow techniques in 3D models.
3. create production-ready 3D assets for animation, VFX and games.
4. evaluate UV mapping and texture quality for optimized 3D assets.

Module	Title and Contents	Hrs.
Module-1:	Introduction 1.1 Introduction to Autodesk Maya interface, navigation and viewports, project folder management, object creation and scene organization, transformation tools (move, rotate, scale). 1.2 Pivot point editing, polygon components (vertex, edge, face), selection techniques, primitive objects, polygon modeling concepts. 1.3 Mirror geometry, combine and separate objects, duplicate special. 1.4 Construction history, freeze transformations, delete history.	08
Module-2:	Advanced Polygon Modeling 2.1 Hard surface modeling techniques, organic modeling techniques, reference image setup, modeling household objects. 2.2 Vehicle modeling basics, character base modeling, edge flow and topology, quad-based modeling, symmetry modeling, smooth mesh preview. 2.3 Mesh cleanup, retopology basics, sculpting tool's introduction, modeling optimization. 2.4 Scene organization using outliners, display layers.	07
Module-3:	UV Mapping and Texturing 3.1 Introduction to UV mapping, UV editor interface, automatic mapping. 3.2 Planar mapping, cylindrical mapping, spherical mapping, camera-based mapping, cut and sew UVs. 3.3 Unfold UVs, layout UVs, UV distortion checking, texel density concepts, texture resolution, file texture nodes, hypershade interface, and material creation. 3.4 Lambert shader, blinn shader, phong shader, arnold standard surface material,	08

	color maps, displacement maps, applying pbr textures.	
Module-4:	Advanced Texturing 4.1 Procedural textures, layered textures, texture painting basics, file path management. 4.2 Texture optimization, arnold renderer introduction, lighting for texture preview, render view, render settings, asset presentation. 4.3 Turntable animation for model presentation. 4.4 Exporting models (FBX, OBJ, Alembic), model optimization for games.	07
Reference Books: - 1. T. Palamar. Mastering Autodesk Maya 2024. Indianapolis, IN: Wiley, 2024. 2. S. Tickoo. Autodesk Maya 2023 for 3D Artists. New Delhi: BPB Publications, 2023. 3. D. Derakhshani. Autodesk Maya 2020 Basics Guide. Mission, KS: SDC Publications, 2020. 4. S. Largent. Maya 8.5 Character Modeling. Boston: Thomson Course Technology, 2007. 5. L. Scott Kelly. Maya 5 Killer Tips. Indianapolis, IN: New Riders, 2004.		
Evaluation Pattern (40:60)		
Total Marks: 50		
Internal Continuous Evaluation (20 Marks): • CCE - I: 10 Marks • CCE - II: 10 Marks • CCE - III: 10 Marks (Best of 2 from CCE I, II & III Selected for final Score)		End Semester Examination (50 Marks): • Question -1: Solve the following questions (5 questions of 2 Marks) • Question -2: Attempt any two out of three questions (3 questions of 10 marks) • Question -3: Attempt any four out of Six questions (6 questions of 05 marks) (50 Marks Converted into 30 Marks)



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Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - V

Type: DSC XI

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: UI / UX (BAST 353)

Course Objectives: Student should be able to...

1. identify the phases of the UI/UX design process.
2. explain principles of user-centered interface design.
3. analyze user needs, preferences and usability testing methods.
4. plan and customize interfaces according to industry standards.

Course Outcomes: Students will be able to...

1. describe UI/UX principles for digital platforms.
2. apply user research methods to develop user-centered designs.
3. use appropriate UI/UX tools for interface development.
4. create wireframes, prototypes, and interactive interfaces based on project requirements.

Module	Title and Contents	Hrs.
Module-1:	Introduction of UI/UX 1.1 Introduction to UI/UX Design and the importance of learning UI/UX Design. 1.2 User Interface (UI) Design and User Experience (UX) Design. 1.3 UI Development and the Human-Centered Design Process. 1.4 Big Picture Thinking, Personas, and User Journey. 1.5 Stages of UX Design and Heuristic Evaluation.	08
Module-2:	UX Design 2.1 Design Thinking and User Experience Research. 2.2 Design Principles, User-Centered Design, Wireframing, and Storyboarding. 2.3 Google Material Design, Role of a UX Designer, Requirement Gathering. 2.4 Research Techniques and Data Analysis. 2.5 Scenarios, User Flows, Flow Mapping, and UX Roadmap.	07
Module-3:	UX Design Process 3.1 Design Testing Methods and Techniques. 3.2 Usability Testing: Types, Process, and Test Planning. 3.3 Prototyping Concepts and Prototyping Tools (e.g., Figma, Adobe XD, Sketch). 3.4 Conducting Usability Testing, Analyzing Results, and Design Refinement.	08
Module-4:	Evaluation and Delivery 4.1 Understanding Usability Test Findings. 4.2 Applying Feedback to Improve User Experience. 4.3 UX Delivery Process and Design Handoff. 4.4 Communication with Developers and the Implementation Team. 4.5 UX Deliverables (Wireframes, Mockups, Prototypes, Style Guides, Design Specifications).	

Reference Books: -

1. S. Krug. Don't Make Me Think, Revisited: A Common Sense Approach to Web Usability. 3rd ed. Berkeley, CA: New Riders, 2024.
2. J. Preece, H. Sharp, and Y. Rogers. Interaction Design: Beyond Human-Computer Interaction. 6th ed. Indianapolis, IN: Wiley, 2023.
3. R. Hartson and P. S. Pyla. The UX Book: Process and Guidelines for Ensuring a Quality User Experience. 2nd ed. Cambridge, MA: Morgan Kaufmann, 2019.
4. D. Norman. The Design of Everyday Things. Revised and expanded ed. New York: Basic Books, 2013.
5. R. Unger and C. Chandler. A Project Guide to UX Design: For User Experience Designers in the Field or in the Making. 2nd ed. Berkeley, CA: New Riders, 2012.

Evaluation Pattern (40:60)**Total Marks: 50****Internal Continuous Evaluation (20 Marks):**

- CCE - I: 10 Marks
- CCE - II: 10 Marks
- CCE - III: 10 Marks

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions
(5 questions of 2 Marks)
- Question -2: Attempt any two out of three questions
(3 questions of 10 marks)
- Question -3: Attempt any four out of Six questions
(6 questions of 05 marks)

(50 Marks Converted into 30 Marks)



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Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - V

Type: DSE XII

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: E-Commerce (BAST 354): E-I

Course Objectives: Student should be able to...

1. identify the basic concepts, types, and components of E-Commerce.
2. explain E-Commerce platforms, technologies and payment systems.
3. use E-Commerce tools, digital marketing and security mechanisms.
4. analyze emerging technologies, security, privacy and trends in E-Commerce.

Course Outcomes: Students will be able to...

1. describe the foundations and types of E-Commerce.
2. apply E-Commerce platforms and digital marketing techniques.
3. analyze payment methods, security mechanisms and E-Commerce technologies.
4. evaluate emerging technologies, privacy and future trends in E-Commerce.

Module	Title and Contents	Hrs.
Module-1:	Overview of E-Commerce 1.1 Introduction and Evolution of E-Commerce. 1.2 Types of E-Commerce (B2B, B2C, C2C, C2B, G2C). 1.3 Internet and Web Technologies. 1.4 Components of E-Commerce, Advantages and Limitations.	08
Module-2:	Trends & Issues of E-commerce 2.1 Online Marketplaces (Amazon, Flipkart, Meesho). 2.2 Shopify and WooCommerce. 2.3 Electronic Catalogs and Shopping Carts. 2.4 Order Processing, Logistics and Supply Chain, Digital Marketing Basics (SEO, SEM, social media).	07
Module-3:	Web Services & Technology 3.1 Payment Gateways. 3.2 UPI, Digital Wallets, Net Banking, Credit/Debit Cards. 3.3 Payment Security, SSL/TLS. 3.4 Digital Signatures, Cybersecurity in E-Commerce.	08
Module-4:	Modes, Matrix & Token Based Systems. 4.1 Mobile Commerce (M-Commerce), Cloud Computing in E-Commerce. 4.2 AI and Chatbots, Recommendation Systems. 4.3 Blockchain Applications, Consumer Protection. 4.4 Privacy and Data Protection, Future Trends in E-Commerce.	07

Reference Books: -

1. D. Chaffey. Digital Business and E-Commerce Management: Strategy, Implementation and Practice. 9th ed. Harlow, UK: Pearson Education, 2022.

2. K. C. Laudon and C. G. Traver. E-Commerce: Business, Technology, Society. Pearson, 2021.
3. Datta and Somani. E-Commerce & Business Communication. 2nd ed., 2018.
4. D. Whiteley. E-Commerce: Strategy, Technologies and Applications. 2017.
5. P. T. Joseph. E-Commerce: An Indian Perspective. 2006.

Evaluation Pattern (40:60)

Total Marks: 50

Internal Continuous Evaluation (20 Marks):

- CCE - I: 10 Marks
- CCE - II: 10 Marks
- CCE - III: 10 Marks

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions
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(50 Marks Converted into 30 Marks)



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Programme: B.Sc.

Semester - V

Type: DSE XII

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: Market Research (BAST 355): E-II

Course Objectives: Student should be able to...

1. describe the fundamental concepts and processes of Market Research.
2. explain the branches, applications and ethical issues of Market Research.
3. apply research designs, proposals, and measurement scales in Market Research.
4. analyze sampling methods and Market Research reports.

Course Outcomes: Students will be able to...

1. summarize the concepts, role, process, and ethics of Market Research.
2. explain consumer, product, advertising, media, and motivational research.
3. design a Market Research proposal using appropriate research designs and measurement scales.
4. analyze sampling methods and prepare effective Market Research reports.

Module	Title and Contents	Hrs.
Module-1:	Marketing Research-Basic understanding 1.1 Meaning of Marker Research & Marketing Research. 1.2 Role of Marketing Research in Marketing Management. 1.3 Process of Marketing Research. 1.4 Ethical Issues in Marketing Research, Nature & contents of Ethical Issues.	08
Module-2:	Branches of Marketing Research 2.1 Consumer Research - Meaning & Scope, Need, Functions. Product Research - Meaning & Scope, Importance. 2.2 Advertising Research - What to Test, When to Test. Media Research – Functions of Media Research. 2.3 Motivational Research - Meaning uses & Limitations. Techniques. 2.4 Marketing Research in India.	07
Module-3:	Marketing Research Proposal & Design & Scales of Measurement 3.1 Marketing Research Proposal – Meaning, Elements of Research Proposal. 3.2 Marketing Research Design – Its Meaning, Its Importance, Types of Research Design, Criteria of good Research Design. 3.3 Scales of Measurement – Meaning of Measurement in Marketing Research. 3.4 Criteria of sound Measurement of Marketing Research.	08
Module-4:	Sampling in Marketing Research & Marketing Research Report 4.1 Meaning of sampling, steps of sampling process. 4.2 Types of sampling plans, 4.3 Meaning of Marketing Research Report. 4.4 Writing criteria of Marketing Research Report. 4.5 Proforma / Format of a Market Research Report. Types of Research Report.	07

Reference Books: -

1. A. C. Burns, A. Veeck, and R. F. Bush. Marketing Research. 9th ed. Hoboken, NJ: Pearson, 2023.

2. N. K. Malhotra. Marketing Research: An Applied Orientation. 7th ed. Noida: Pearson India Education Services, 2019.
3. P. Kotler, K. L. Keller, A. Koshy, and M. Jha. Marketing Management: A South Asian Perspective. 14th ed. Noida: Pearson India, 2018.
4. L. Silver and R. E. Stevens. The Essentials of Marketing Research. New York: Routledge, 2012.
5. S. A. Chunawala. Essentials of Marketing Research. Mumbai: Himalaya Publishing House, 2010.

Evaluation Pattern (40:60)

Total Marks: 50

Internal Continuous Evaluation (20 Marks):

- CCE - I: 10 Marks
- CCE - II: 10 Marks
- CCE - III: 10 Marks

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions
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(50 Marks Converted into 30 Marks)



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Faculty of Science & Technology

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Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - V

Type: DSC P V

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: Major Practical -V BASP 356
2D Game Design + 3D Maya Modeling and Texturing (Practical's based on BAST 351+BAST 352 courses)

Course objectives: Student should be able to...

1. describe the basic tools and components used in Unity and Autodesk Maya.
2. apply Unity tools to create basic 2D gameplay mechanics and interactions.
3. analyze modeling, UV mapping, texturing and animation techniques in software.
4. create interactive 2D game environments and 3D assets using software.

Course Outcomes: Students will be able to...

1. explain basic 2D game development and 3D modeling concepts.
2. apply gameplay mechanics, animation, collision and interaction techniques in Unity.
3. analyze 3D models, UV maps, materials, textures and game assets for quality and functionality.
4. create a functional 2D game prototype integrating suitable 3D assets, animations and interactive elements.

Sr. No.	Title and Contents	Hrs.
1.	Working with Backgrounds and 2D Scene Creation in Unity.	60
2.	Importing and Using Sprites in Unity	
3.	Creating Character Movement in Unity.	
4.	Character Animation using the Animator.	
5.	Adding Platforms and Collision Detection.	
6.	Creating a Collectibles System.	
7.	Creating a Simple Enemy.	
8.	Developing a Simple 2D Game Level.	
9.	Create a simple polygon model and apply a suitable material by using software.	
10.	Create a polygon model, perform UV mapping, and apply a basic texture by using software.	
11.	Model a toolbox with tools and apply suitable textures by using software.	
12.	Create a NURBS model and apply suitable materials by using software.	
13.	Model a desktop computer setup and apply suitable textures by using software.	
14.	Create an office desk scene and apply suitable textures by using software.	
15.	Model a mechanical fan, apply textures, and render the final scene by using software.	

Reference Books: -

1. J. Halpern. Developing 2D Games with Unity: Independent Game Programming with C#. Berkeley, CA: Apress, 2018.
2. M. McShaffry and D. Graham. Game Coding Complete. 4th ed. Boston, MA: Course Technology PTR, 2013.
3. W. Lidwell, K. Holden, and J. Butler. Universal Principles of Design. Beverly, MA: Rockport

Publishers, 2010.

4. R. Unger and C. Chandler. A Project Guide to UX Design: For User Experience Designers in the Field or in the Making. 2nd ed. Berkeley, CA: New Riders, 2012.
5. J. Schell. The Art of Game Design: A Book of Lenses. 3rd ed. Boca Raton, FL: CRC Press, 2019.

Evaluation Pattern (40:60)

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal: 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

End Semester Examination (30 Marks):

- ESE = 30 Marks



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science & Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - V

Type: DSE P VI

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: Major Elective Practical -VI BASP 357 UI /UX+ E-commerce (Practical's Based on BAST 353+BAST 354 E-I courses)

Course Objectives: Student should be able to...

1. identify the fundamental concepts of UI/UX, E-Commerce, Internet and user-centered design.
2. use UI/UX principles and E-Commerce concepts to develop basic digital interfaces.
3. analyze user needs, usability, navigation, security and E-Commerce requirements.
4. design user personas, journeys, wireframes, prototypes and E-Commerce interfaces.

Course Outcomes: Students will be able to...

1. interpret the basic principles and applications of UI/UX and E-Commerce.
2. apply user-centered design and E-Commerce concepts to practical problems.
3. evaluate usability, interface structures, user journeys and E-Commerce security issues.
4. develop interactive prototypes and user-friendly E-Commerce interface solutions.

Sr. No.	Title and Contents	Hrs.
1.	Design any App logo or Brand logo.	60
2.	Create a simple user persona for a Food delivery mobile app.	
3.	Design a simple prototype (Digital) for an ATM interface.	
4.	Draw a simple wireframe for a Travel website	
5.	Creating a site map for college website	
6.	Draw a navigation menu structure for a college website.	
7.	Design a simple login page (Mobile or Web) using paper or any tool.	
8.	Create a user journey map for booking movie tickets online.	
9.	Understanding E-Commerce, the Early Internet, and Networking Categories.	
10.	Studying the Characteristics, Services, and Components of the Internet.	
11.	Understanding Internet Security and Network and Website Security Risks.	
12.	Studying DoS Attacks, Viruses, Unauthorized Access, and Website Vulnerabilities.	
13.	Understanding Homepage Creation, Metadata, and Enterprise Information Portals.	
14.	Studying E-Commerce Implementation through eBay, Registration, and the Bidding Process.	
15.	Studying the Growth of eBay, PayPal, and Online Fund Transfer through NEFT.	

Reference Books: -

1. J. J. Garrett. The Elements of User Experience: User-Centered Design for the Web and Beyond. 2nd ed. Berkeley, CA: New Riders, 2011.
2. D. Norman. The Design of Everyday Things. Revised and expanded ed. New York: Basic Books, 2013.

3. S. Krug. Don't Make Me Think, Revisited: A Common Sense Approach to Web Usability. 3rd ed. Berkeley, CA: New Riders, 2014.
4. D. Chaffey and F. Ellis-Chadwick. Digital Marketing: Strategy, Implementation and Practice. 8th ed. Harlow: Pearson, 2022.
5. K. C. Laudon and C. G. Traver. E-Commerce: Business, Technology, Society. 17th ed. Boston: Pearson, 2023.

Evaluation Pattern (40:60)		
Total Marks: 50		
<table border="1" style="width: 100%;"><tr><td style="width: 50%;">Internal Evaluation (20 Marks): • Journal: 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks </td><td style="width: 50%;">Practical Exam Paper (30 Marks): • ESE : 30 Marks </td></tr></table>	Internal Evaluation (20 Marks): • Journal: 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks	Practical Exam Paper (30 Marks): • ESE : 30 Marks
Internal Evaluation (20 Marks): • Journal: 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks	Practical Exam Paper (30 Marks): • ESE : 30 Marks	



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Faculty of Science & Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - V

Type: DSE P VI

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: Major Elective Practical -VI BASP 357 UI /UX+ Market research (Practical's Based on BAST 353 + BAST 354 E-II courses)

Course Objectives: Student should be able to...

1. recognize the basic principles of UI/UX and Market Research.
2. relate user requirements with UI/UX principles and Market Research processes.
3. compare different research methods, sampling techniques and interface design approaches.
4. develop user-centered UI/UX solutions based on research findings.

Course Outcomes: Students will be able to...

1. interpret user needs, interface elements and basic Market Research concepts.
2. use surveys, interviews, sampling techniques and usability methods to collect user information.
3. contrast research findings and interface alternatives to determine suitable design solutions.
4. invent innovative personas, user journeys, wireframes and prototypes for digital applications.

Sr. No.	Title and Contents	Hrs.
1.	Design any App logo or Brand logo.	60
2.	Create a simple user persona for a Food delivery mobile app.	
3.	Design a simple prototype (Digital) for an ATM interface.	
4.	Draw a simple wireframe for a Travel website.	
5.	Create a site map for college website.	
6.	Draw a navigation menu structure for a college website.	
7.	Design a simple login page (Mobile or Web) using paper or any tool.	
8.	Create a user journey map for booking a movie ticket online.	
9.	Understanding the Meaning and Significance of Marketing Research in Modern Times.	
10.	Studying the Limitations of Marketing Research.	
11.	Understanding the Process of Marketing Research.	
12.	Studying Ethical Issues in Marketing Research.	
13.	Understanding the Steps Involved in Marketing Research.	
14.	Studying Different Types of Sampling Methods.	
15.	Understanding Probability and Non-Probability Sampling Methods.	

Reference Books: -

1. J. J. Garrett. The Elements of User Experience: User-Centered Design for the Web and Beyond. 2nd ed. Berkeley, CA: New Riders, 2011.
2. D. Norman. The Design of Everyday Things. Revised and expanded ed. New York: Basic Books, 2013.
3. S. Krug. Don't Make Me Think, Revisited: A Common Sense Approach to Web Usability. 3rd ed. Berkeley, CA: New Riders, 2014.
4. N. K. Malhotra. Marketing Research: An Applied Orientation. 7th ed. Harlow: Pearson, 2019.
5. M. Saunders, P. Lewis, and A. Thornhill. Research Methods for Business Students. 9th ed. Harlow: Pearson, 2023.

Evaluation Pattern (40:60)	
Total Marks: 50	
Internal Evaluation (20 Marks): • Journal : 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks	Practical Exam Paper (30 Marks): • ESE = 30 Marks



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Faculty of Science & Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - V

Type: VSC III

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: (BASPVS III) 3D Maya Rigging

Course Objectives: Student should be able to...

1. understand basic concepts and workflow of character rigging in software.
2. illustrate joint structures, skeletons, FK/IK, constraints and skinning techniques.
3. construct character controls, skeletons and basic rigs using Maya.
4. judge the effectiveness of skinning, deformation and rig controls for character animation.

Course Outcomes: Students will be able to...

1. summarize the fundamental principles and workflow of character rigging.
2. use FK, IK, constraints, deformers and skinning techniques to build character rigs.
3. compare different rigging and deformation techniques for effective character movement.
4. devise and animate a functional biped character rig using software.

Sr. No.	Title and Contents	Hrs.
1.	Create a simple rig by using maya rigging interface.	60
2.	Creating basic joint chains.	
3.	Building and orienting a skeleton.	
4.	Creating FK (forward kinematics) controls.	
5.	Creating IK (inverse kinematics) controls.	
6.	Applying constraints (point, orient, and parent constraints).	
7.	Skin binding and painting skin weights.	
8.	Using basic deformers for character animation.	
9.	Rigging a simple arm and leg.	
10.	Rigging a simple hand with finger controls.	
11.	Rigging a basic biped character.	
12.	Creating basic character control curves.	
13.	Testing character poses and control rig.	
14.	Creating a basic walk cycle animation.	
15.	Rig and animate a simple character.	

Reference Books: -

1. M. Bakich. How to Cheat in Adobe Animate CC: Get Professional Results Without Breaking the Bank. Burlington, MA: Focal Press, 2017.
2. J. Abrecque. Learn Adobe Animate CC for Multiplatform Animations. Berkeley, CA: Apress, 2016.
3. T. Palamar. Mastering Autodesk Maya. Indianapolis, IN: Sybex, 2015.
4. K. Dmitriev. Synfig Studio – Beginner's Guide. Packt Publishing, 2012.

5. R. Williams. The Animator's Survival Kit. Revised ed. New York: Faber & Faber, 2012.

Evaluation Pattern (40:60)

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal : 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

- ESE = 30 Marks



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Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - V

Type: OJT I

Marks: 100

Credits: 4

From: A. Y. 2026-27

Name of the Course and code: (BASPOJT I) On Job Training

Course Objectives: Student should be able to...

1. bridge skill gaps by providing hands-on work experience in real-world environments.
2. foster cooperation with local industries, MSMEs, and craft centers to match market demands.
3. shift focus from rote memorization to active, experience-based learning and problem-solving.
4. equip students with 21st-century skills, professional ethics, and an understanding of workplace dynamics.

Course Outcomes: Students will be able to...

1. demonstrate proficiency in domain-specific technical tasks and job roles mapped with National Occupational Standards (NOS).
2. exhibit improved communication, teamwork, leadership, and adaptability in professional settings.
3. apply analytical abilities to resolve practical operational challenges on-site.
4. display higher self-reliance and readiness for entrepreneurship or immediate workforce entry.

Internship Guidelines for Students

1. Documentation: Annexures – I to IX (compulsory).
2. Safety: Students must follow ethical, safety, and confidentiality rules by company/organization and institutional norms during the OJT.
3. Complete allotted tasks, maintain a daily logbook.
4. Attendance: Minimum 75% required.
5. Discipline: Respectful and ethical behavior during On-the-job training is mandatory.
6. Prepare and submit project report and presentation.

Evaluation Pattern (40:60)

Total Marks: 100

Internal Evaluation (40 Marks)

- Appendix VII: Supervisor Evaluation of Intern: 20 Marks
- Attendance Diary/Logbook: 20 Marks

End Semester Exam (60 marks)

- Viva Voce / Presentation: 20 Marks
- Depth of knowledge and skills acquired: 20 Marks
- Report: 20 Marks

Passing Criteria: Minimum 50 out of 100 marks.



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Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - V

Type: CEPI

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: (BASPCEP I) Community Engagement Programme

Course Objectives: Student should be able to...

1. promote understanding of rural culture and values.
2. learn about rural development and agriculture.
3. identify rural social and economic challenges.
4. apply classroom knowledge to real-life situations.

Course Outcomes: Students will be able to...

1. understand rural life and social realities.
2. develop empathy and community engagement.
3. appreciate local knowledge and contributions.
4. contribute to rural socioeconomic development.

Module	Title of Content	Hrs.
	Community Engagement Programme (CEP) The Community Engagement Programme (CEP) is an integral part of the undergraduate curriculum under NEP 2020. It aims to connect students with society by involving them in activities that promote civic responsibility, scientific temper, and sustainable development. This program encourages experiential learning by exposing students to community challenges and enabling them to contribute positively using their academic knowledge and innovative ideas. Rules and Regulations 1) Attendance: Minimum 75% required in all modules. 2) Discipline: Respectful and ethical behavior in the community is mandatory. 3) Documentation: Field diary and report must be handwritten or typed by the student only. 4) Safety: Students must follow safety guidelines and institutional norms during field visits. 5) Consent: No photos or videos of community members without prior permission. 6) The fieldwork conference is part of the timetable and is mandatory. Faculty should hold a fieldwork conference FOREIGHTNIGHTLY for all students. Guidelines for Implementation: 1) The Community Engagement Project should be different from the regular programmes of NSS/NCC/Green Club /F.P., etc.	60

	2) Department shall designate a faculty coordinator for programme. 3) The programme should be implemented during the semester as per the academic calendar. 4) Collaborations with NGOs, local bodies, and government departments are encouraged for meaningful engagement. 5) Students should work in groups (5–10 members) for field visits and activities. 6) A field diary should be maintained by each student and verified by the faculty. 7) Final assessment should be done jointly by the internal coordinator and an external evaluator based on set criteria. Department should maintain documentary evidence such as photos, attendance, and reports for audit.	
Practical Evaluation Pattern (40:60)		
Total Marks: 50		
Internal Continuous Evaluation: (20 M)	End Semester Examination: (30 M)	
Q.1 Internal Work = 20M	Q. 1 = 30 M	



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Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: DSC XIII

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: 3D Game Design (BAST 361)

Course Objectives: Student should be able to...

1. recognize the fundamental concepts, genres, mechanics and workflows of 3D game design.
2. illustrate 3D modeling, texturing, animation, lighting and physics concepts used in games.
3. use game engines and development tools to create interactive 3D game environments.
4. integrate game assets, AI, UI, physics and gameplay elements to develop a 3D game prototype.

Course Outcomes: Students will be able to...

1. summarize the principles, genres and development pipeline of 3D games.
2. apply modeling, texturing, animation, physics and game-engine techniques in practical projects.
3. analyze gameplay, AI behavior, performance, testing and optimization requirements.
4. devise and present a functional 3D game prototype using appropriate development tools.

Module	Title and Contents	Hrs.
Module-1:	Fundamentals of Game Design 1.1 Introduction to game design concepts. 1.2 Types of games and genres. 1.3 Elements of game design: mechanics, dynamics, aesthetics (MDA framework). 1.4 Overview of game engines (Unity). 1.5 Game development pipeline.	08
Module-2:	3D Games Modelling and Texturing 2.1 Introduction to 3D Modelling Tools. 2.2 Polygon Modelling Techniques. 2.3 Primitive Objects and Mesh Editing, UV Mapping Concepts. 2.4 Textures, Materials and Shaders, Lighting Basics in 3D Games. 2.5 Optimization Techniques for Game Assets, Importing 3D Models into Game Engines.	07
Module-3:	Game Engines, Animation & Physics 3.1 Introduction to 3D Game Engines (Unity / Unreal – Overview). 3.2 Game Object Architecture, Scene Creation and Level Design. 3.3 Basic Animation Principles, Rigging and Skeletal Animation. 3.5 Physics Systems (Collision, Gravity, Rigid Bodies). 3.6 Camera Setup and Player Controls, Sound and Audio Integration.	08
Module-4:	Game Testing & Deployment 4.1 Scripting Basics for Games, Artificial Intelligence Basics (NPC Behavior). 4.2 User Interface (UI) and HUD Design, Game Testing and Debugging. 4.3 Performance Optimization, Game Publishing Platforms Deployment for PC, Mobile and Console. 4.4 Future Trends in 3D Game Design.	07

Reference Books: -

1. E. Adams and A. Rollings. Fundamentals of Game Design. 3rd ed. Berkeley, CA: New Riders, 2014.
2. R. Bartle. Designing Virtual Worlds. Indianapolis, IN: New Riders, 2003.
3. D. H. Eberly. 3D Game Engine Architecture. Burlington, MA: Morgan Kaufmann, 2005.
4. D. H. Eberly. 3D Game Engine Design: A Practical Approach to Real-Time Computer Graphics. 2nd ed. Burlington, MA: Morgan Kaufmann, 2006.
5. T. Fullerton. Game Design Workshop: A Playcentric Approach to Creating Innovative Games. 4th ed. Boca Raton, FL: CRC Press, 2023.

Evaluation Pattern (40:60)**Total Marks: 50****Internal Continuous Evaluation (20 Marks):**

- CCE - I : 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (30 Marks):

- Question -1: Solve the following questions
(5 questions of 2 Marks)
- Question -2: Attempt any two out of three questions
(3 questions of 10 marks)
- Question -3: Attempt any four out of Six questions
(6 questions of 05 marks)

(50 Marks Converted into 30 Marks)



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Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: DSC XIV

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course: VFX (BAST 362)

Course Objectives: Student should be able to...

1. identify the basic interface, composition, layers and timeline features of software.
2. interpret keyframes, animation principles, text, shapes and visual effects.
3. modify layers, masks, effects, keying and tracking to create visual compositions.
4. develop professional VFX compositions using compositing, rendering and export techniques.

Course Outcomes: Students will be able to...

1. describe the workflow and essential tools of software.
2. transfer animation and compositing principles to practical VFX exercises.
3. evaluate masking, keying, Roto Brush, tracking, effects and rendering techniques.
4. invent a complete VFX project using appropriate visual-effects and compositing workflows.

Module	Title and Contents	Hrs.
Module-1:	Interface 1.1 Workspaces, panels, viewers, Projects and compositions, Composition settings. 1.2 Composition basics, Precomposing, nesting, and pre-rendering, Timecode, and time display units Projects, importing footage, supported import formats, Frame rate. 1.3 Importing 3D image files, Previewing, working with footage items, Views, and previews. 1.4 Fast Previews, Region of interest, Resolution, Cameras, lights, points of interest.	08
Module-2:	Layers and Effects 2.1 Creating layers, Adjustment layers, working with layers, Layer properties, Types of layers. 2.2 Blending modes and layer styles, 3D layers, Cameras, lights and points of Interest, Animation and key frames. 2.3 Graph Editor, Apply immersive video effects, Construct VR environments in After Effects. 2.4 Setting, selecting and deleting key frames, Keyframe interpolation, Speed.	07
Module-3:	Working with Texts 3.1 Creating and editing text layers, types of text, Formatting characters and the Character panel. 3.3 Animating text, Text animation presets, Text anchor point properties, Extruding text and shape layers. 3.3 Tracking 3D camera movement, Animating with Puppet tools, Color basics. 3.4 Drawing, painting and various technique.	08

Module-4:	Rendering 4.1 Basics of rendering and exporting, Render and export with the Render Queue panel. 4.2 Render and export with Adobe Media Encoder, supported output formats, Render settings. 4.3 Encoding and compression options for movies, Rendering and exporting still Images and still-image sequences Transparency and compositing. 4.4 Keying, Roto Brush, Refine Edge, Refine Matte effects, Markers, Basics of rendering and exporting.	07
Reference Books: - 1. E. Dinur. The Complete Guide to Photorealism for Visual Effects, Visualization and Games. New York: Routledge, 2021. 2. J. Fridsma. Adobe After Effects Classroom in a Book (2023 Release). San Francisco: Adobe Press, 2023. 3. B. Gyncild. Adobe After Effects CC Classroom in a Book (2019 Release). San Francisco: Adobe Press, 2019. 4. I. V. Kerlow. The Art of 3D Computer Animation and Visual Effects. 5th ed. Hoboken, NJ: Wiley, 2021. 5. T. Meyer and C. Meyer. After Effects Apprentice: Real-World Skills for the Aspiring Motion Graphics Artist. 4th ed. New York: Routledge, 2016.		
Evaluation Pattern (40:60)		
Total Marks: 50		
Internal Continuous Evaluation (20 Marks): • CCE - I : 10 Marks: Activity • CCE - II: 10 Marks: Activity • CCE - III: 10 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (30 Marks): • Question -1: Solve the following questions (5 questions of 2 Marks) • Question -2: Attempt any two out of three questions (3 questions of 10 marks) • Question -3: Attempt any four out of Six questions (6 questions of 05 marks) (50 Marks Converted into 30 Marks)	



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Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: DSC XV

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: Dynamics and Rendering (BAST 363)

Course Objectives: Student should be able to...

1. recite the fundamental concepts of Paint Effects, lighting, shading and rendering in software.
2. classify different lighting, rendering, shading and dynamic simulation techniques.
3. correlate rendering techniques with appropriate lighting, materials and visual effects.
4. modify dynamics, nParticles, nCloth, fur and hair simulations to create realistic effects.

Course Outcomes: Students will be able to...

1. paraphrase the basic principles of rendering, lighting, shading and dynamics.
2. complete practical Maya exercises involving Paint Effects, Toon Shading, lighting and materials.
3. contrast different rendering, particle, cloth and dynamic simulation techniques.
4. devise professional 3D scenes combining dynamics, lighting, shading and rendering techniques.

Module	Title and Contents	Hrs.
Module-1:	Paint Effects and Toon Shading 1.1 Paint Effects, Introduction to Paint Effects in Maya, Using the Paint Effects Canvas 1.2 Painting on 3D Objects, Understanding Paint Effects Strokes, Creating and Applying Paint Effects, Designing and Controlling Brushes 1.3 Designing and customizing Paint Effects Brushes, Creating complex effects by adding strokes to curves, Shaping and controlling strokes 1.4 Using Behavior Controls for Paint Effects, Modifying stroke attributes and appearance 1.5 Introduction to Toon Shading, Applying Toon Shaders to 3D Objects, Creating cartoon and stylized rendering effects	08
Module-2:	Lighting and Shading Techniques 2.1 Introduction to Lighting in Maya, Types of Lights in Maya, Direct and Indirect Lighting. 2.2 Introduction to Global Illumination, Image-Based Lighting, Using HDRI for Environment Lighting, Physical Sun and Sky. 2.3 Hypershade and Shader Networks, Creating and Applying Materials, Arnold Standard Surface Shader, Diffuse, Specular, Roughness and Transmission 2.4 Creating Reflections and Refractions, Creating Blurred Reflections and Refractions.	07
Module-3:	Rendering and Compositing 3.1 Introduction to Rendering and Compositing in Maya, Creating and Managing Render Layers, Render Passes and AOVs, Setting Up Render Layers for Compositing 3.2 Using Arnold Renderer for Rendering, Arnold Render Settings and Quality Controls, Introduction to Fluid Containers, Fluids and nParticles, Creating Fluid Containers, Creating and Rendering Fluid Effects	08

	3.3 Introduction to nParticles, Creating and Editing nParticles, nParticle Attributes and Properties, Fluid and nParticle Interactions 3.4 Creating nParticles and nCloth Interactions, making nParticles Collide with nCloth Surfaces, nParticle Effects and Rendering 3.5 Using nParticles to Simulate Liquids, Applying Wind and Other Forces to nParticles	
Module-4:	Dynamic Effects 4.1 nCloth and Rigid Body Dynamics, Introduction to Dynamic Effects in Maya, Creating nCloth Objects, Cloth Simulation and Dynamic Behavior 4.2 Making nCloth Objects Collide with Other Objects, Creating Rigid Body Dynamics, Fur and Hair Effects, Introduction to Fur and Hair in Maya 4.3 Adding Fur to Characters and Objects, Styling and Grooming Fur, Creating and Editing Hair Systems, Rendering Fur and Hair using Arnold 4.4 Character Clothing and Dynamic Rendering, Creating Clothing for Characters using nCloth, Simulating Character Clothing 4.5 Adding Wind and Other Dynamic Forces, Collision Detection and Cloth Deformation, Shading and Texturing Dynamic Objects, Combining Dynamics, Lighting and Shading for Final Rendering	07

Reference Books: -

1. A. W. Barsky. Maya 2018 Fundamentals: Modeling, Texturing, Rigging, Animation, and Rendering. 3rd ed. New York: Routledge, 2018.
2. D. Derakhshani. Introducing Autodesk Maya 2016. Indianapolis, IN: Sybex, 2015.
3. A. Kumar. Beginning VFX with Autodesk Maya: Create Industry-Standard Visual Effects from Scratch. New York: Apress, 2022.
4. T. Palamar. Mastering Autodesk Maya 2016. Indianapolis, IN: Sybex, 2015.
5. J. Lanier. Maya 8 Character Modeling. Indianapolis, IN: Sybex, 2007.

Evaluation Pattern (40:60)

Total Marks: 50

Internal Continuous Evaluation (20 Marks):

- CCE - I : 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (30 Marks):

- Question -1: Solve the following questions
(5 questions of 2 Marks)
- Question -2: Attempt any two out of three questions
(3 questions of 10 marks)
- Question -3: Attempt any four out of Six questions
(6 questions of 05 marks)
(50 Marks Converted into 30 Marks)



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Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: DSE XVI

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: AR for Animation (BAST 364): E-I

Course Objectives: Student should be able to...

1. understand key concepts, principles and terminology related to Augmented Reality.
2. categorize AR devices, interaction methods, technologies and applications.
3. classify the potential of emerging AR technologies and their applications across industries.
4. select suitable AR technologies and applications for different creative and industrial domains.

Course Outcomes: Students will be able to...

1. divide the fundamental concepts, history, types and development of Augmented Reality.
2. evaluate knowledge of AR devices and interaction techniques to practical applications.
3. justify current AR technologies with emerging trends, market opportunities and industry applications.
4. improve AR-based applications such as interactive cards, product visualizations, scenes and creative experiences.

Module	Title and Contents	Hrs.
Module-1:	Introduction of Augmented Reality 1.1 Defining Augmented Reality, Some Other Types of Reality-Mixed reality, 1.2 Augmented virtuality, Extended reality, History of Augmented Reality, 1.3 Augmented reality hits the mainstream, evaluating the Technology Hype Cycle. 1.4 From Factors-Cost and availability, Perceived usefulness, Tracking, 1.5 Field of view, Visuals, Assessing Adoption Rates.	08
Module-2:	Current State of Augmented Reality 2.1 Mobile devices, AR headsets, AR glasses, 2.2 Considering Controllers-Touch, Gaze, 2.3 Keyboard and mouse, Voice, Hand tracking, 2.4 Motion controllers, Recognizing the Current Issues with Augmented Reality. Identifying Near Future Hardware Heads-up displays AR devices Comparing Current and Future Options	07
Module-3:	Assessing the Future of Augmented Reality 3.1 Analyzing Near Future Changes-Evaluating the market, 3.2 Considering AR's "Killer App", Predicting the Impact Mobile Apps for Experiencing Augmented Reality-Google Translate, 3.3 Amazon AR View, Blippar, AR City, ARise, 3.4 Ingress and Pokémon Go, Measure Kit and Measure, 3.5 InkHunter, Sketch AR.	08

Module-4:	Exploring Augmented Reality 4.1 Use Cases-Art, Education 4.2 Industry and Commerce, Entertainment Industries That Will Be Transformed by Augmented 4.3 Reality Travel, Museums, Aerospace, Retail, Military 4.4 Education, Entertainment, Real Estate Advertising and Marketing.	07
Reference Books: - 1. S. Aukstakalnis. Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR. Boston: Addison-Wesley Professional, 2016. 2. A. B. Craig. Understanding Augmented Reality: Concepts and Applications. Burlington, MA: Morgan Kaufmann, 2013. 3. P. Mealy. Virtual & Augmented Reality for Dummies. Hoboken, NJ: Wiley, 2018. 4. T. Parisi. Learning Virtual Reality: Developing Immersive Experiences and Applications for Desktop, Web, and Mobile. Sebastopol, CA: O'Reilly Media, 2015. 5. D. Schmalstieg and T. Höllerer. Augmented Reality: Principles and Practice. Boston: Addison-Wesley Professional, 2016.		
Evaluation Pattern (40:60)		
Total Marks: 50		
Internal Continuous Evaluation (20 Marks): • CCE - I : 10 Marks: Activity • CCE - II: 10 Marks: Activity • CCE - III: 10 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (30 Marks): • Question -1: Solve the following questions (5 questions of 2 Marks) • Question -2: Attempt any two out of three questions (3 questions of 10 marks) • Question -3: Attempt any four out of Six questions (6 questions of 05 marks) (50 Marks Converted into 30 Marks)	



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science & Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: DSE XVI

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: VR for Animation (BAST 365) : E-II

Course Objectives: Student should be able to...

1. recall the fundamental concepts, components, applications and terminology of Virtual Reality.
2. distinguish between VR environments, representations, input/output devices and interaction methods.
3. solve basic problems related to transformations, motion tracking, visual perception and VR interaction.
4. assess rendering, rasterization, latency and frame-rate factors affecting VR performance.

Course Outcomes: Students will be able to...

1. explain the working principles of Virtual Reality systems and identify their applications in different domains.
2. analyze the design and implementation of hardware components used in Virtual Reality systems.
3. implement motion and tracking techniques in Virtual Reality environments using appropriate tools.
4. develop an interactive VR application using Vuforia and related Virtual Reality technologies.

Module	Title and Contents	Hrs.
Module-1:	Introduction of Virtual Reality 1.1 Defining Virtual Reality, History of VR, Human Physiology and Perception, Key Elements of Virtual Reality Experience, Virtual Reality System, 1.2 Interface to the Virtual World-Input & output Visual, Aural & Haptic Displays, 1.3 Applications of Virtual Reality	08
Module-2:	Representing the Virtual World 2.1 Representation of the Virtual World, 2.2 Visual Representation in VR, 2.3 Aural Representation in VR 2.4 Haptic Representation in VR	07
Module-3:	The Geometry of Virtual Worlds & The Physiology of Human Vision 3.1 The Geometry of Virtual Worlds & The Physiology of Human Vision Geometric Models. 3.2 Changing Position and Orientation, Axis-Angle. 3.3 Representations of Rotation, Viewing Transformations. 3.4 Chaining the Transformations, Human Eye, eye movements & implications for VR.	08
Module-4:	Visual Perception & Rendering 4.1 Visual Perception - Perception of Depth, Perception of Motion. 4.2 Perception of Color, Combining Sources of Information Visual Rendering - Ray Tracing and Shading Models. 4.3 Rasterization, Correcting Optical Distortions. 4.4 Improving Latency and Frame Rates.	07

Reference Books: -

1. W. R. Sherman and A. B. Craig. Understanding Virtual Reality: Interface, Application, and Design. 2nd ed. San Francisco: Morgan Kaufmann, 2018.
2. D. A. Bowman, E. Kruijff, J. J. LaViola Jr., and I. Poupyrev. 3D User Interfaces: Theory and

Practice. Boston: Addison-Wesley Professional, 2005.

3. O. Bimber and R. Raskar. Spatial Augmented Reality: Merging Real and Virtual Worlds. Wellesley, MA: A K Peters, 2005.

4. G. J. Kim. Designing Virtual Reality Systems: The Structured Approach. London: Springer, 2005.

5. J. J. LaViola, E. Kruijff, R. P. McMahan, D. A. Bowman, and I. Poupyrev. 3D User Interfaces: Theory and Practice. 2nd ed. Boston: Addison-Wesley Professional, 2017.

Evaluation Pattern (40:60)

Total Marks: 50

Internal Continuous Evaluation (20 Marks):

- CCE - I : 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (30 Marks):

- Question -1: Solve the following questions
(5 questions of 2 Marks)
- Question -2: Attempt any two out of three questions
(3 questions of 10 marks)
- Question -3: Attempt any four out of Six questions
(6 questions of 05 marks)

(50 Marks Converted into 30 Marks)



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Faculty of Science & Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: DSC P VII

Marks: 50

Credits: 2

From: A. Y. 2026-27

**Name of the Course and code: Major Practical -VII BASP 366
3D Game Design + VFX (Practical's based on BAST 361 + BAST 362 courses)**

Course Objectives: Student should be able to...

1. identify the fundamental concepts of 3D game design, graphics and visual effects.
2. demonstrate modeling, materials, lighting, animation and compositing techniques using appropriate software.
3. manipulate game objects, physics, animations, layers, masks and effects to create interactive scenes.
4. combine 3D game elements and VFX techniques to produce interactive visual experiences.

Course Outcomes: Students will be able to...

1. outline the basic workflow of 3D game development and visual effects production.
2. transfer modeling, animation, lighting, compositing and effects concepts into practical projects.
3. refine game scenes, animations, visual effects, masks, and compositions through testing and iteration.
4. produce a functional 3D game scene with integrated visual effects using software's.

Sr. No.	Title and Contents	Hrs.
1.	Create Basic 3D Objects in Unity.	60
2.	Import and Place 3D Models in Unity.	
3.	Create a Simple 3D Scene with Materials and Lighting.	
4.	Create Basic Character Animation in Unity.	
5.	Add a Character Controller and Character Movement.	
6.	Apply Physics and Collision Detection using Rigidbody and Colliders.	
7.	Develop a Simple 3D Game Level with Collectibles and Basic UI.	
8.	Working with Compositions in Adobe After Effects.	
9.	Selecting and Animating Layers in Adobe After Effects.	
10.	Animating Position, Scale, Rotation, and Opacity of Objects.	
11.	Creating an Animated Background in Adobe After Effects.	
12.	Creating Custom Effects in Adobe After Effects.	
13.	Creating Text Effects and Animations in Adobe After Effects.	
14.	Creating and Animating Masks and Shape Layers in Adobe After Effects.	
15.	Rendering a Composition in Adobe After Effects.	

Reference Books: -

1. T. Fullerton. Game Design Workshop: A Playcentric Approach to Creating Innovative Games. 4th ed. Boca Raton, FL: CRC Press, 2023.
2. R. King. 3D Animation for the Raw Beginner Using Autodesk Maya. February 14, 2019.
3. N. Boughen, ed. 3ds Max Maya Lighting. Plano, TX: Wordware Publishing Inc., January 17, 2018.
4. S. Rogers. Level Up! The Guide to Great Video Game Design. 2nd ed. Hoboken, NJ: Wiley, 2014.
5. R. Koster. A Theory of Fun for Game Design. 2nd ed. Sebastopol, CA: O'Reilly Media, 2013.

Evaluation Pattern (40:60)**Total Marks: 50****Internal Evaluation (20 Marks):**

- Journal: 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

- ESE = 30 Marks



Karmaveer Bhaurao Patil University, Satara

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Faculty of Science & Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: DSE P VIII

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: Major Elective Practical-VIII BASP 367 Dynamics and Rendering + AR for Animation (Practical's based on BAST 363+BAST 364 E-I courses)

Course Objectives: Student should be able to...

1. recognize the fundamental concepts of rendering, dynamics and Augmented Reality.
2. illustrate lighting, Paint Effects, Toon Shading, particle and cloth simulation techniques.
3. compare AR technologies, hardware platforms, interaction methods and user experiences.
4. design AR applications by integrating rendered 3D assets, animations and interactive elements.

Course Outcomes: Students will be able to...

1. summarize the principles of rendering, dynamics and AR technologies.
2. demonstrate Paint Effects, lighting, Toon Shading, nParticles, and nCloth techniques in software.
3. appraise AR devices, interaction methods, FOV, usability and adoption factors.
4. develop an AR application integrating optimized 3D models, animations and appropriate interaction techniques.

Sr. No.	Title and Contents	Hrs.
1.	Setting Up Render Settings with Arnold Sun and Sky.	60
2.	Rendering Paint Effects – Creating Grass in Maya and Applying Shadow Effects.	
3.	Designing Paint Effects Brushes – Growing Flowers and Adding Leaves.	
4.	Applying Paint Effects to Maya Text Curves – Creating at Least Three Different Styles.	
5.	Creating Toon Shading Effects on 3D Objects.	
6.	Creating Cloth Dynamics – Animated Flag Using nCloth.	
7.	Creating Snow and Rain Simulations Using nParticles.	
8.	Create a comparative study of AR, VR, MR, AV and XR with real-world examples and diagrams.	
9.	Build a timeline project on the History of Augmented Reality, highlighting milestones like Ivan Sutherland's early HMD and the success of Pokémon Go.	
10.	Analyze AR's position in the Gartner Hype Cycle and prepare a short market evaluation report.	
11.	Evaluate different AR form factors (mobile, headset, glasses) based on cost, availability, FOV and usability.	
12.	Conduct a field-of-view (FOV) comparison study between mobile AR and head-mounted AR devices.	
13.	Create & develop a simple marker-based AR application using a mobile device.	
14.	Test and compare AR experiences on mobile apps such as Google Translate (live translation overlay) and Measure.	
15.	To Conduct a user adoption survey and analyze public perception of AR technology.	

Reference Books: -

1. A. Y. C. Nee and S. K. Ong, eds. Springer Handbook of Augmented Reality. Cham: Springer, 2022.
2. J. Linowes and K. Babilinski. Augmented Reality for Developers: Build Practical Augmented Reality Applications with Unity, ARCore, ARKit, and Vuforia. Birmingham: Packt Publishing,

2017.

3. D. Schmalstieg and T. Hollerer. Augmented Reality: Principles and Practice. Boston: Addison-Wesley Professional, 2016.
4. J. Peddie. Augmented Reality: Where We Will All Live. Cham: Springer, 2017.
5. G. Kipper and J. Rampolla. Augmented Reality: An Emerging Technologies Guide to AR. Waltham, MA: Syngress, 2012.

Evaluation Pattern (40:60)	
Total Marks: 50	
Internal Evaluation (20 Marks): • Journal : 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks	Practical Exam Paper (30 Marks): • ESE= 30 Marks



Karmaveer Bhaurao Patil University, Satara

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Faculty of Science & Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: DSE P VIII

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: Major Elective Practical-VIII BASP 367 Dynamics and Rendering + VR for Animation (Practical's based on BAST 363 + BAST 364 E-II courses)

Course Objectives: Student should be able to...

1. recall the fundamental concepts of rendering, dynamics and Virtual Reality.
2. classify rendering techniques, dynamic simulations, VR hardware and perception methods.
3. correlate lighting, shading, dynamics, perception and VR performance factors in practical applications.
4. design interactive VR experiences using rendered 3D assets and appropriate VR technologies.

Course Outcomes: Students will be able to...

1. state the basic principles of rendering, dynamics and Virtual Reality systems.
2. demonstrate Arnold rendering, Paint Effects, Toon Shading, nCloth and nParticles techniques in Maya.
3. critique VR hardware, depth perception, motion perception, frame rate, color perception and motion sickness factors.
4. develop a basic VR experience by integrating rendered 3D assets and appropriate interaction techniques.

Sr. No.	Title and Contents	Hrs.
1.	Setting Up Render Settings with Arnold Sun and Sky.	60
2.	Rendering Paint Effects – Creating Grass in Maya and Applying Shadow Effects.	
3.	Designing Paint Effects Brushes – Growing Flowers and Adding Leaves.	
4.	Applying Paint Effects to Maya Text Curves – Creating at Least Three Different Styles.	
5.	Creating Toon Shading Effects on 3D Objects.	
6.	Creating Cloth Dynamics – Animated Flag Using nCloth.	
7.	Creating Snow and Rain Simulations Using nParticles.	
8.	Creating Day and Night Scenes Using Arnold Physical Sky.	
9.	Study of Virtual Reality Hardware Components	
10.	Installation and Setup of a VR System	
11.	Comparison of Different VR Devices	
12.	Study of Depth Perception in VR	
13.	Experiment on Motion Perception and Frame Rate	
14.	Color Perception in Virtual Environment	
15.	Study of Motion Sickness Causes in VR	

Reference Books: -

1. A. Y. C. Nee and S. K. Ong, eds. Springer Handbook of Augmented Reality. Cham: Springer, 2022.
2. J. Linowes and K. Babilinski. Augmented Reality for Developers: Build Practical Augmented Reality Applications with Unity, ARCore, ARKit, and Vuforia. Birmingham: Packt Publishing, 2017.
3. D. Schmalstieg and T. Hollerer. Augmented Reality: Principles and Practice. Boston: Addison-Wesley Professional, 2016.

4. J. Peddie. Augmented Reality: Where We Will All Live. Cham: Springer, 2017.
5. G. Kipper and J. Rampolla. Augmented Reality: An Emerging Technologies Guide to AR. Waltham, MA: Syngress, 2012.

Evaluation Pattern (40:60)

Total Marks: 50

Internal Evaluation (20 Marks):	Practical Exam Paper (30 Marks):
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- Journal: 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

- ESE = 30 Marks



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Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: VSC IV

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: (BASPVS IV) Rotoscoping

Course Objectives: Student should be able to...

1. describe the fundamental principles of rotoscoping and explain its role in the visual effects production pipeline.
2. apply bone systems, skin weighting, and Silhouette FX tools to isolate objects and characters.
3. construct accurate mattes for moving objects using professional rotoscoping techniques and tools.
4. integrate rotoscoping and compositing workflows to develop production-ready visual effects.

Course Outcomes: Students will be able to...

1. illustrate the significance of rotoscoping in professional VFX production workflows
2. produce clean and detailed mattes with proper edge refinement, feathering, and shape consistency.
3. organize roto shapes using grouping, parenting, and layering techniques for efficient scene management.
4. implement exported roto mattes in compositing projects using industry-standard VFX workflows.

Sr. No.	Title and Contents	Hrs.
1.	Creating basic Rotoscoping using Bezier and B-Spline Shapes.	60
2.	Point Tracking in Silhouette FX.	
3.	Planar Tracking in Silhouette FX.	
4.	Rotoscoping a Moving Object using Multiple Shapes.	
5.	Green Screen (Chroma Key) Rotoscoping in Silhouette FX (Output in Color, Gray, and Alpha).	
6.	Create a Simple Clean Plate using Paint Tools.	
7.	Frame Repair using the Paint Node in Silhouette FX.	
8.	Export Rotoscope Mattes from Silhouette FX.	
9.	Creating simple track Mocha Pro.	
10.	Planar Tracking using Mocha Pro.	
11.	Creating and Animating Masks using Mocha Pro.	
12.	Basic Screen Replacement using Mocha Pro with Adobe After Effects.	
13.	Stabilizing Video using Mocha Pro.	
14.	Exporting Tracking Data from Mocha Pro to Adobe After Effects.	
15.	Roto and Tracking a Clip Sequence using Silhouette FX and Mocha Pro.	

Reference Books: -

1. R. Brinkmann. The Art and Science of Digital Compositing. 2nd ed. Burlington, MA: Morgan Kaufmann, 2008.
2. B. Bratt. Rotoscoping Techniques and Tools for the Aspiring Artist. 2011.

3. Boris FX. Silhouette User Guide. Boris FX, July 12, 2024.
4. S. Wright. Digital Compositing for Film and Video: Production Workflows and Techniques. 5th ed. New York: Routledge, 2024.
5. J. A. Okun and S. Zwerman, eds. VES Handbook of Visual Effects: Industry Standard VFX Practices and Procedures. 3rd ed. New York: Routledge, 2025.

Evaluation Pattern (40:60)		
Total Marks: 50		
<table border="1" style="width: 100%;"><tr><td style="width: 50%;">Internal Evaluation (20 Marks): • Journal: 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks </td><td style="width: 50%;">Practical Exam Paper (30 Marks): • ESE= 30 Marks </td></tr></table>	Internal Evaluation (20 Marks): • Journal: 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks	Practical Exam Paper (30 Marks): • ESE= 30 Marks
Internal Evaluation (20 Marks): • Journal: 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks	Practical Exam Paper (30 Marks): • ESE= 30 Marks	



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Faculty of Science & Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: SEC III

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and code: (BASPSEC III) Maya Character Rigging

Course Objectives: Student should be able to...

1. describe the fundamental principles of character rigging, skeletal systems, and rigging workflows in Autodesk Maya.
2. explain the concepts of joints, inverse kinematics (IK), forward kinematics (FK), constraints, and controllers used in character rigging.
3. construct character rigs by creating skeletons, skinning models, and applying rig controls in Autodesk Maya.
4. develop production-ready character rigs with efficient deformation systems and animation-friendly control setups.

Course Outcomes: Students will be able to...

1. identify the components and workflows involved in character rigging.
2. implement skeletal structures, IK/FK systems, constraints, and skinning techniques for 3D characters.
3. examine rig performance and optimize deformations for realistic character movement.
4. produce a complete, animation-ready character rig using industry-standard rigging practices in Autodesk Maya.

Sr. No.	Title and Contents	Hrs.
1.	Animate a Bouncing Ball using Squash & Stretch, Timing, and Spacing.	60
2.	Create a Pendulum Animation using Arcs and Overlapping Action.	
3.	Animate a Ball with Legs Walk Cycle.	
4.	Create a Basic Humanoid Walk Cycle.	
5.	Animate a basic Run Cycle.	
6.	Animate a Character Jump with Anticipation and Landing.	
7.	Animate a Head Turn with Eye Movement and Blinking.	
8.	Create Basic Facial Expressions (Happy, Sad, Angry, Surprise, Neutral).	
9.	Animate an Idle Character with Breathing and Weight Shift.	
10.	Animate a Walk-to-Run Transition.	
11.	Animate a Character Picking Up and Placing an Object.	
12.	Animate a Character Pushing or Pulling a Light Object.	
13.	Animate a Character Sitting on and Standing Up from a Chair.	
14.	Animate a Simple Character Action Sequence (Walk → Pick Up Object → Place Object).	
15.	Create a Character Animation demonstrating the basic principles of animation.	

Reference Books: -

1. D. Derakhshani. Introducing Autodesk Maya. Boca Raton, FL: CRC Press, 2024.
2. S. Tickoo. Character Animation: A Tutorial Approach Using Maya. USA: CADCIM Technologies, 2011.
3. R. King. 3D Animation for the Raw Beginner Using Autodesk Maya. Boca Raton, FL: CRC Press, 2019.
4. T. Palamar. Mastering Autodesk Maya 2020. Indianapolis, IN: Sybex, 2019.
5. J. E. Park. Understanding 3D Animation Using Maya. New York: Springer, 2007.

Evaluation Pattern (40:60)**Total Marks: 50****Internal Evaluation (20 Marks):**

- Journal: 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

- ESE=30 Marks



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Board of Studies in Computational Sciences

Programme: B.Sc.

Semester - VI

Type: FP I

Marks: 50

Credits: 2

From: A. Y. 2026-27

Name of the Course and Code: (BASP FP I) Field Project

Course Objectives: Student Should be able to...

1. apply animation concepts and production techniques in real-world environments.
2. examine professional practices, workflows, and technologies used in the animation industry.
3. develop skills in observation, documentation, data analysis, and project reporting.
4. demonstrate effective communication, collaboration, and project management skills.

Course Outcomes: Students will be able to...

1. apply animation principles and production techniques during field-based activities.
2. examine the workflow, tools, and production practices followed in animation and multimedia organizations.
3. analyze and interpret information collected during field investigations.
4. develop professional documentation and project reports based on field observations.

Nature of Field Project

Hrs.

The Field Project is an experiential learning component introduced under NEP 2020 to bridge the gap between classroom learning and professional practice. The course provides students with opportunities to apply animation concepts, techniques, and production methodologies in real-world environments through field visits, industry interaction, case studies, surveys, and project-based activities.

The course emphasizes observation, documentation, analysis, problem-solving, creativity, teamwork, and professional communication. Students are expected to investigate animation studios and multimedia production houses, game development companies, visual effects organizations, advertising agencies, broadcasting industries, and other related sectors to understand contemporary production

60

Evaluation Pattern (40:60)

Total Marks: 50

Internal Continuous Evaluation: (20 M)

End Semester Examination: (30 M)

- Q.1 Internal Work = 20M

- Q. 1 = 30 M

Bachelor of Science (B. Sc.) Part - III: Animation Science

Semester VI

C.C. (Co-Curricular) (Credit 2)

Evaluation Pattern (40:60)

Total Marks: 50

Internal Continuous Evaluation: (20 M)

End Semester Examination: (30 M)

- Q.1 Internal Work = 20M

- Q. 1 = 30 M