

Branch Name:	Bachelor of Computer Application (Graphics Animation and VFX)
Program Code:	CS102
Course Title:	Match moving & Camera Tracking (PFTrack)
Course Code:	15-CAM307-3C
Pre-requisite Course:	Matchmoving & Camera Tracking (PFTrack) is 3D Modeling & Animation Foundation (Blender) – II.

Course Objectives (CO):

This course is intended to make the students to equip students with mathematical tools for precise specification, analysis, and reasoning in computer science.

- To introduce students to the principles of matchmoving, camera tracking, and motion tracking used in visual effects production.
- To develop proficiency in PFTrack for creating accurate camera and object tracking solutions.
- To understand the integration of CGI elements with live-action footage through tracking and scene reconstruction
- To develop practical skills in solving tracking challenges, lens distortion correction, and camera calibration.
- To prepare students for professional careers in matchmoving, visual effects, animation, and post-production industries

Teaching and Examination Scheme:

Teaching Scheme (Hours. per week)				Evaluation Scheme (Marks)								
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory				Practical				Total
				University Assessment		Continuous Assessment		University Assessment		Continuous Assessment		
				Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	
3	-	-	3	18	50	09	25	-	-	-	-	75

Course Contents:			
Sr. No	Topic	Total Hours	Weightage (%)
1.	Introduction to Matchmoving and PFTrack Fundamentals: Overview of matchmoving workflows, VFX production pipeline, camera tracking concepts, PFTrack interface, project setup, footage preparation, coordinate systems, tracking principles, and scene analysis techniques.	15	25
2.	2D and 3D Camera Tracking Techniques: Feature tracking, automatic and manual tracking, camera solving, error correction, tracking optimization, scene reconstruction, point cloud generation, and camera calibration workflows.	15	25

3.	Object Tracking and Scene Integration: Object tracking techniques, planar tracking concepts, moving object reconstruction, ground plane setup, geometry creation, lens distortion correction, survey data integration, and scene alignment for CGI integration.	15	25
4.	Graph Theory: Applications in Computer Science: Only theory Graphs in data structures (e.g., network models), Social network modeling, Routing algorithms – basic overview, Real-life applications: maps, GPS, game theory, etc. Permutation and Combination: Definition and Prove That nPr and nCr Theorem With examples.	15	25

Course Learning Outcomes (CLO):

At the end of this course, the student would be able to:

- CLO1:** Understand the principles of matchmoving and camera tracking in visual effects production.
- CLO2:** Create accurate camera tracking solutions using PFTrack.
- CLO3:** Integrate tracked camera data with 3D software and compositing applications.
- CLO4:** Solve complex tracking challenges involving moving cameras and objects.
- CLO5:** Produce production-ready matchmoving projects suitable for professional VFX pipelines

List of Textbooks

- The VES Handbook of Visual Effects – Jeffrey A. Okun & Susan Zwerman.
- Matchmoving: The Invisible Art of Camera Tracking – Industry Learning Guide.
- PFTrack User Guide and Official Documentation.

List of Text Reference Books

- Seymour Lipschutz & Marc Lipson – Schaum's
- Digital Compositing for Film and Video – Steve Wright.
- The Art and Science of Digital Compositing – Ron Brinkmann

E-Resources / Web Links

- PFTrack Official Documentation
- PFTrack Learning Resources
- FXPHD Matchmoving Courses
- Foundry Nuke Learning Portal
- Gnomon Workshop
- CG Spectrum VFX Learning Resources
- Animation Mentor VFX Resources

Mapping of CLO, PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	H	M	L										H	M	
CLO2	H	H	M	M									H	M	
CLO3	H	M	H	M									M	H	
CLO4	M	H	M	H	M								H	H	

H: High, M: Medium, L: Low