

FA26 — CS 453 Calendar

Computer Graphics • MWF, 50 min • Fall 2026 • Fakhir Shaheen • fakhirshaheen@fccollege.edu.pk

Lec #	Date	Topic	Deliverables
1	Mon, 31 Aug	What graphics is (and isn't); setup; first pixels & gradients	A1 released
2	Wed, 2 Sep	Bresenham's line algorithm	
3	Fri, 4 Sep	Color & alpha; primitives; fills (inside-test, flood fill)	
4	Mon, 7 Sep	Vectors & the dot product	A1 due, A2 released
5	Wed, 9 Sep	Parametric lines, circles, ellipses	
6	Fri, 11 Sep	Bézier curves; de Casteljau	
7	Mon, 14 Sep	2×2 matrices: rotation, scale	A2 due, A3 released
8	Wed, 16 Sep	Homogeneous coordinates; composition & order	
9	Fri, 18 Sep	Reference frames & the scene graph	
10	Mon, 21 Sep	Rays: $\mathbf{p} = \mathbf{o} + t\mathbf{d}$; marching & nearest hit	A3 due, A4 released
11	Wed, 23 Sep	2D light & shadow: fan of rays, occluders	
12	Fri, 25 Sep	Exact ray-segment intersection; 2D soft shadows	
13	Mon, 28 Sep	3D vectors; cross product; the camera	A4 due, A5 released
14	Wed, 30 Sep	Ray-sphere intersection	
15	Fri, 2 Oct	Multi-object scenes; nearest hit; antialiasing	
16	Mon, 5 Oct	Normals; diffuse (Lambert) shading; point lights	A5 due, A6 released
17	Wed, 7 Oct	Shadow rays; reflection & metal	
18	Fri, 9 Oct	Refraction & glass (Snell); recursive rays	
19	Mon, 12 Oct	Why ray tracing is slow; acceleration ideas	A6 due, A7 released
20	Wed, 14 Oct	Building a BVH: AABBs, slab test, traversal	
21	Fri, 16 Oct	Distribution ray tracing: soft shadows, depth of field	
22	Mon, 19 Oct	Render show-and-tell; midterm review	
—	Wed, 21 Oct	Midterm	
—	Fri, 23 Oct	<i>Fall Break</i>	A7 due (midterm scene)
23	Mon, 26 Oct	Ray-triangle intersection; barycentric coordinates	A8 released
24	Wed, 28 Oct	Meshes & the OBJ format; loading real models	
25	Fri, 30 Oct	Light & radiometry: flux, irradiance, radiance, solid angle	
26	Mon, 2 Nov	The rendering equation & BRDFs	A8 due, A9 released
27	Wed, 4 Nov	Monte Carlo integration; path tracing, emissive materials	
28	Fri, 6 Nov	Importance sampling; the path tracer in practice	
—	Mon, 9 Nov	<i>Iqbal Day</i>	
29	Wed, 11 Nov	Real-time: input $\rightarrow$ update $\rightarrow$ draw, every frame	A9 due, A10 released
30	Fri, 13 Nov	The GPU; the programmable pipeline; the depth buffer	
31	Mon, 16 Nov	Hello triangle (ModernGL, GLSL)	
32	Wed, 18 Nov	Fragment shaders: $\text{color} = f(x, y)$ per pixel	A10 due, A11 released; Proposal assigned
33	Fri, 20 Nov	Shadertoy: SDFs & raymarching	
34	Mon, 23 Nov	3D on the GPU: the MVP chain; perspective	
35	Wed, 25 Nov	Blinn-Phong lighting; textures & UV mapping	A11 due
36	Fri, 27 Nov	Final-project kickoff; idea pitches	
37	Mon, 30 Nov	Project lab: scoping check-ins	
38	Wed, 2 Dec	Lab: interactive 3D scene	Final project due after the exam period
39	Fri, 4 Dec	Shadow mapping: depth buffer, two-pass rendering	
40	Mon, 7 Dec	Graphics meets AI: NeRFs, Gaussian splatting	
41	Wed, 9 Dec	Course review & exam prep	
—	Thu, 10 Dec	Final Exams	

Weekly assignments (released Friday, due the following Friday): A1 Scene from scratch • A2 Balls along Bézier paths • A3 Solar system • A4 2D light & shadows • A5 First 3D render • A6 Lit & reflective scene • A7 Ray tracer flagship (midterm scene) • A8 Ray-traced mesh • A9 Path tracer • A10 Hello triangle & live shader • A11 Interactive 3D scene.

Grading: Assignments (*weekly*) 40% • Project 20% • Midterm 15% • Final exam 25%. *There is no attendance policy.*