Physically Based Rendering and Material Appearance Modelling

Timetable

This course runs as a 3-weeks course in June.

Calendar:	**31 May** to **21 June**	(5 June is a holiday: Constitution Day)
Location:	**Building 305, Room IT005**	(booked for the entire 3-weeks period)
Daily schedule:	**workdays 9–12**	(lecture and face-to-face help for exercises)

Afternoons (except the last day) are set off for studying and doing independent work on exercises. One or two mornings may also be left open for doing independent work.

The **last day** is set off for preparation and **presentation of a slide** that presents the work in your lab journal. The slide is to be prepared in the morning and presented in the afternoon.

Lab journal and presentation slide hand-in deadline: **23:59 Thursday 21 June 2018**.

Textbook and Notes

The main text book for the course is

P Pharr, M., Jakob, W., and Humphreys, G. *Physically Based Rendering: From Theory to Implementation*, third edition, Morgan Kaufmann/Elsevier, 2017. http://www.pbrt.org/.

DTU Findit access:
http://www.sciencedirect.com.proxy.findit.dtu.dk/science/book/9780128006450

In addition, we will upload papers to DTU Inside that serve sometimes as supplementary reading material sometimes as part of the curriculum.

Prerequisites and Programming Resources

See separate documents uploaded to CampusNet File Sharing (`prerequisites.pdf` and `pbrt.pdf`).

Assessment

Throughout the course you are expected to maintain a lab journal that presents the deliverables of the daily worksheets. At the last day, you are expected to prepare a slide with results from your lab journal in the morning and present it in the afternoon. The lab journal and the presentation slide are to be handed in at the final hand-in deadline (see above). Your work is assessed in its entirety, and you will receive a pass or not pass grade.

JERF 2018

Preliminary Course Schedule

Week	Subject	Curriculum	Exercises
1 31/5	Introduction, basic radiometry, Lambertian reflection, light sources.	**P**: Sections 1–1.2, 1.7 (21 pages) **P**: Sections 5.4–5.6 (18 pages) **P**: Pages 507–512 and Section 8.3 (8 pages) **P**: Pages 707–714, 719–721 and Sections 12.4–12.5 (18 pages)	*Worksheet 1*
2 1/6	Light and colour, sun and sky.	Book excerpt [Reinhard et al. 2010] (44 pages) Paper [Preetham et al. 1999] (10 pages) (**P**: Sections 5–5.3, 21 optional pages)	*Worksheet 2*
3 4/6	Wave theory of light, reflection and transmission, Russian roulette.	Book excerpt [Frisvad 2008] (17 pages) **P**: Section 8.2 (17 pages) **P**: Section 13.7 (3 pages)	*Worksheet 3*
4 6/6	Monte Carlo integration, soft shadows, direct lighting, ambient occlusion.	**P**: Sections 13–13.3, 13.5–13.6.5 (28 pages) **P**: Section 14.2–14.2.3 (11 pages) **P**: Section 14.3 (11 pages)	*Worksheet 4*
5 7/6	Path tracing.	**P**: Sections 14.4–14.5 (19 pages)	*Worksheet 5*
6 8/6	Particle tracing, photon mapping.	**P**: Section 16–16.2 (44 pages)	*Worksheet 6*
7 11/6	Dispersion, spectral rendering, density estimation.	Paper [Sun et al. 2000] (6 pages) Thesis excerpt [Schjøth 2009] (18 pages)	*Worksheet 7*
8 12/6	Microfacet models, importance sampling.	**P**: Sections 8.4–8.5 (19 pages) **P**: Sections 13.10, 14–14.1.3 (19 pages)	*Worksheet 8*
9 13/6	Radiative transfer, volume rendering.	**P**: Sections 11–11.3 (21 pages) **P**: Sections 15–15.3 (17 pages)	*Worksheet 9*
10 14/6	Scattering by particles, material appearance.	Paper [Frisvad et al. 2007] (10 pages) Paper [Dal Corso et al. 2016] (4 pages)	*Worksheet 10*
11 15/6	Tabulated distributions environment mapping, high dynamic range.	**P**: Section 13.6.7 (4 pages) **P**: Section 12.6, 14.2.4 (11 pages) Book excerpt [Reinhard et al. 2010] (25 pages)	*Worksheet 11*
12 18/6	BSSRDF, subsurface scattering, diffusion.	**P**: Section 11.4 (11 pages) **P**: Section 15.4 (14 pages) **P**: Section 15.5 (24 pages)	*Worksheet 12*
13 19/6	Directional subsurface scattering.*	Optional paper [Frisvad et al. 2014] (12 pages)	*Worksheet 12*
14 20/6	Camera and eye: depth of field, glare.	**P**: Sections 6–6.2 (21 pages) **P**: Section 13.6.6 (1 page) Paper [Ritschel et al. 2009] (10 pages)	(*Worksheet 13*)
15 21/6			Slide preparation, slide presentation.

* Advanced topic covered for inspiration.