Technology
Arts Sciences
TH Köln

Course
KAT2 - Camera Technology

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General information

Long name	Camera Technology
Approving CModule	KAT2_BaMT
Responsible	Prof. Dr. Gregor Fischer Professor Fakultät IME
Level	Bachelor
Semester in the year	winter semester
Duration	Semester
Hours in self-study	60
ECTS	5
Professors	Prof. Dr. Gregor Fischer Professor Fakultät IME
Requirements	Attending the courses PHO1, PHO2 and SIGA
Language	German, English if necessary
Separate final exam	Yes

Final exam

Details

Written exam with arithmetic and comprehension excercises

Minimum standard

50% of maximum points

Exam Type

Written exam with arithmetic and comprehension excercises

Lecture / Exercises

Learning goals

Knowledge

color imaging methods
color mosaic and spectral sensitivity
color interpolation (demosaicking)
white balance (incl. AWB)
color correction

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camera lenses
lens types (telephoto, normal, panorama, fish eye, zoom, macro, tilt/shift, telecentric)
aberration and correction
construction types (Petzval, Anastigmate, Gauß, Triplet ...)
inner focus, zoom, image stabilization
characteristics / technical data (optical sizes, aberration, vignetting, stray light)
modelling and measurement of lenses (MTF/resolution, distortion, vignetting, stray light)

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camera systems and their characteristics
SLR-, system- and compact cameras
videocameras
HDR-cameras
contrastmanagement
autofocus
electronic viewfinder

Skills

specify and explain the operation of color processing and related methods in a digital camera

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understand and define optical functionality and characteristics of different lens constructions

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derive and explain correction models for an optical system from lens properties

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analyze camera systems and their characteristics with respect to hardware (incl. autofocus and view finder) and distinguish between image processing methods

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2

Exercises (whole course)	1
Exercises (shared course)	0
Tutorial (voluntary)	0

Separate exam

none

Practical training

Learning goals

Skills

analyze DNG color correction model and apply it for inspection of color reproduction quality

create and recognise relationship between spectral sensitivity and metamerism of a digital camera

recognise and assess artefacts in the image (aberration, stray light, vignetting, ...)

analyze and assess MTF and resolution

inspection and review of color reproduction quality for digital cameras

measurement of resolution for digital cameras

inspection and review of autofocus accuracy

implementation of a procedure for contrast management and realization of a simple automatic image control

present and document results

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	2
Tutorial (voluntary)	0

Separate exam

Exam Type

working on practical scenarion (e.g. in a lab)

Details

Short technical discussion during lab excercise

Reports about lab excercises

Minimum standard

Reports for all lab excercises must be delivered in correct form with correct results