

## Course

# BV1 - Image Processing

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### ^ General information

Long name	Image Processing
Approving CModule	<u>BV1_BaMT</u>
Responsible	Prof. Dr. Dietmar Kunz Professor Fakultät IME im Ruhestand
Level	Bachelor
Semester in the year	summer semester
Duration	Semester
Hours in self-study	60
ECTS	5
Professors	Prof. Dr. Dietmar Kunz Professor Fakultät IME im Ruhestand
Requirements	Basic course mathematics Basic course computer science Basic course signal theory
Language	German
Separate final exam	Yes

### Final exam

#### Details

In the oral exam, typical problems in image processing are presented. The student should make suggestions concerning suitable algorithms to be applied and to explain typical effects of these algorithms.

#### Minimum standard

The students must be able to explain the operation of linear filters and the structure of the spatial frequency spectrum. Moreover, they must be able to recall important nonlinear filters.

### Exam Type

In the oral exam, typical problems in image processing are presented. The student should make suggestions concerning suitable algorithms to be applied and to explain typical effects of these algorithms.

## ^ Lecture

### Learning goals

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#### Knowledge

Image processing  
camera calibration  
homogeneous point operations  
linear filters  
processing in frequency domain  
filter banks and wavelets  
image compression  
adaptive filters  
change of sampling grid  
change of quantization  
morphological filters  
color image processing  
motion  
correspondence analysis  
registration

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Being able to describe important image processing algorithms, including their algorithmic structure and their effect on images.

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#### Skills

select problem specific image processing methods

### Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	3
Tutorial (voluntary)	0

## Separate exam

none

## ^ Practical training

### Learning goals

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#### Knowledge

Image processing  
camera calibration  
homogeneous point operations  
linear filters  
processing in frequency domain  
filter banks and wavelets  
image compression  
adaptive filters  
change of sampling grid  
change of quantization  
morphological filters  
color image processing  
motion  
correspondence analysis  
registration

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Image processing with ImageJ  
ImageJ  
Java  
Eclipse

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#### Skills

implement image processing methods  
Plugins  
Macros

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apply image processing methods using ImageJ

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Identify and assess effects of processing in images

### Expenditure classroom teaching

Type

Attendance (h/Wk.)

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Practical training

2

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Tutorial (voluntary)

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## Separate exam

### Exam Type

solving exercises within limited functional / methodical scope

### Details

process images according to given exercise problems and present results

### Minimum standard

All exercises must be processed so far that expected effects of the algorithms become observable.