



# Image Analysis and Object Recognition

Exercise Sessions

Summer Semester 2024

(Course materials for internal use only!)

**Computer Vision in Engineering – Prof. Dr. Rodehorst**

M.Sc. Mariya Kaisheva

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# Contact Data



**M. Sc. Mariya Kaisheva**

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**Office:** Schwanseestraße 143, room 1.15

**Phone:** +49 (0) 36 43/58 38 65

**Consultation Hours:** on request



# General Information

## **Biweekly meetings:**

- Thursdays starting at **11:15** (starting time was updated after the first lab class)
- Lecture Hall 6, Coudraystraße 9 A

## **Six assignments:**

- to be solved in small groups (3 members per group)
- serve as exam prerequisite

## **Final project:**

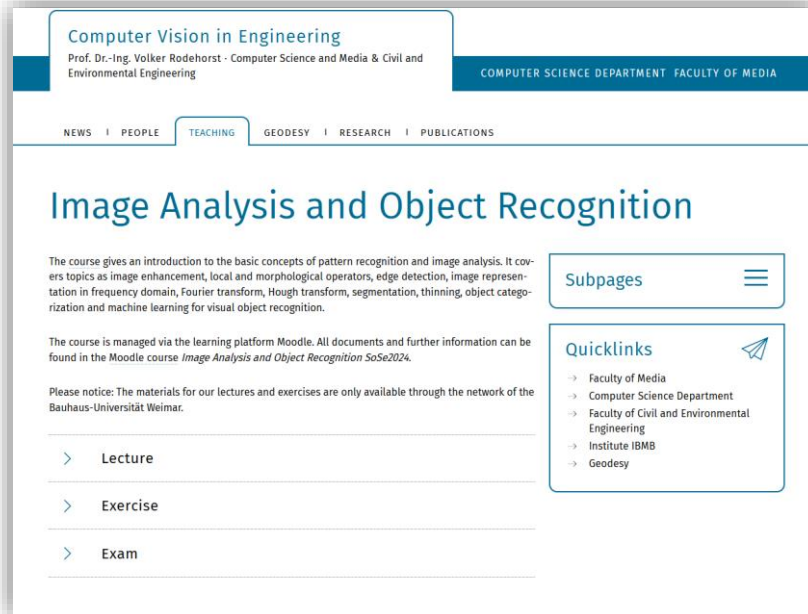
- to be solved in small groups (groups stay the same throughout the semester)
- required for the full completion of the course



# General Information

## Course materials:

- [Moodle](#)
- [University webpage](#)



## Image Analysis and Object Recognition SoSe2024

### General

Collapse all

**Welcome to the course "Image Analysis and Object Recognition" in the summer semester 2024.**


### Format of teaching:

- All materials will be provided in digital form in this moodle course. The materials are available for download until the end of the semester.
- Lectures, exercises and the final project will be held in presence. The learning materials are uploaded in regular intervals.
- The exercises and the final project involve group work (3 students). Group registration starts on **18th of April** during the first exercise class.

### Interaction with teachers:

- All relevant information and updates are provided here in the moodle course.
- For questions of potentially general relevance please use the **Forum** (see below) first.
- With other questions please refer to Mariya Kaisheva, [mariya.kaisheva@uni-weimar.de](mailto:mariya.kaisheva@uni-weimar.de).

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 [Forum](#)

 [Message Board](#)

 [Group Selection](#)

> **Lecture 1**

▼ **Lecture 2**

**Image Representation, Basic Image Enhancement, Binary Images**

# General Information

## Course materials on Moodle:

- lecture slides
- exercise class materials
- assignment submissions
- exam preparation materials

learning materials will be  
uploaded on a regular basis

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Forum

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> Lecture 1

▼ Lecture 2

Image Representation, Basic Image Enhancement, Binary Images

# General Information

## Course materials on Moodle:

- lecture slides
- exercise class materials
- assignment submissions
- exam preparation materials
- message board
- discussion forum

If you are looking for group members, **use the forum** to inform your classmates.

### Image Analysis and Object Recognition SoSe2024

#### General

[Collapse all](#)

Welcome to the course "Image Analysis and Object Recognition" in the summer semester 2024.

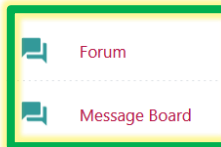
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Group Selection

> Lecture 1

▼ Lecture 2

Image Representation, Basic Image Enhancement, Binary Images

# Agenda

## Topics:

- Assignment 1.** Image enhancement, Binarization, Morphological operators
- Assignment 2.** Gradient of Gaussian filtering, Förstner interest operator
- Assignment 3.** Shape detection based on Hough-voting
- Assignment 4.** Filtering in the frequency domain, Fourier descriptors for shape recognition
- Assignment 5.** Image segmentation using clustering
- Assignment 6.** Convolutional neural networks for image classification
- Final Project.** - *Will be announced during the last exercise class* -

# Agenda

## Start date and submission deadlines:

<b>Assignment 1.</b>	18.04.24 – 01.05.24
<b>Assignment 2.</b>	02.05.24 – 15.05.24
<b>Assignment 3.</b>	16.05.24 – 29.05.24
<b>Assignment 4.</b>	30.05.24 – 12.06.24
<b>Assignment 5.</b>	13.06.24 – 26.06.24
<b>Assignment 6.</b>	27.06.24 – 10.07.24
<b>Final Project.</b>	11.07.24 – 22.09.24

**Wednesday by 23:00**  
(Central European Time)



# Workflow

## Small groups

- **3 people** per group
- group **members stay the same** during the semester
- **group selection via Moodle** will be possible **until 28<sup>th</sup>** of April

**Disclaimer:** All students who have previously completed the assignments, please contact me as soon as possible!



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Lecture 1

Lecture 2

Image Representation, Basic Image Enhancement, Binary Images

# Workflow

## Necessary software



- licensed product
- installed in the LiNT-Pool (room 2.17 in S143)
- needed for the lab classes:  
*image processing toolbox*



- free software
- required packages:  
*general, control, signal, image*

Check the [university webpage](https://www.uni-weimar.de/en/university/structure/central-university-facilities/scc-it-service/study-work-digitally/software/matlab-use-on-private-device/)\* for information on MATLAB licences

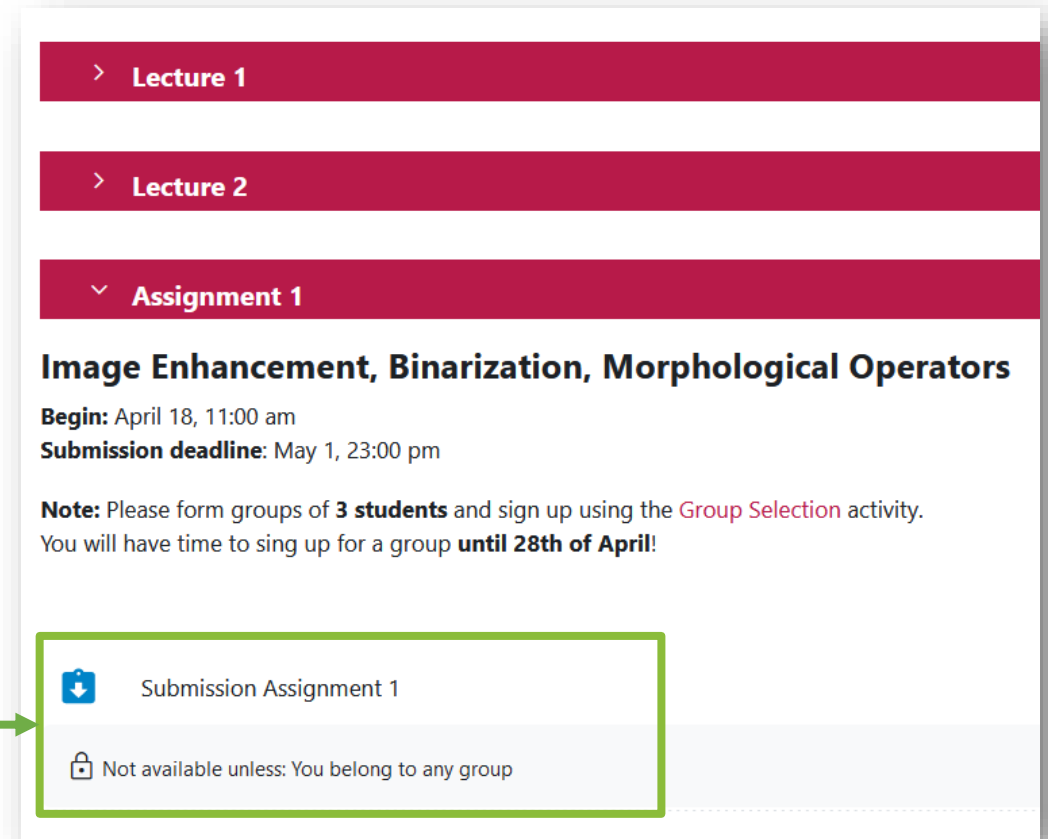


\* <https://www.uni-weimar.de/en/university/structure/central-university-facilities/scc-it-service/study-work-digitally/software/matlab-use-on-private-device/>

# Workflow

## Deliverables

- with each submission provide:
  - o well commented source code (\*.m files)
  - o images used as input (if applicable)
  - o short documentation (if applicable)
- upload using Moodle
- only one submission per group needed
- do NOT include personal data like names and student IDs in the submitted code file(s)



The screenshot shows a Moodle course page with a sidebar on the left containing three items: 'Lecture 1', 'Lecture 2', and 'Assignment 1'. The 'Assignment 1' item is expanded, showing details for the assignment titled 'Image Enhancement, Binarization, Morphological Operators'. The details include the start time 'Begin: April 18, 11:00 am', the submission deadline 'Submission deadline: May 1, 23:00 pm', and a note: 'Note: Please form groups of 3 students and sign up using the Group Selection activity. You will have time to sing up for a group until 28th of April!'. At the bottom of the assignment details, there is a section for 'Submission Assignment 1' which is currently locked, indicated by a padlock icon and the text 'Not available unless: You belong to any group'. A green line from the text 'upload using Moodle' in the deliverables list points to this submission section.

> Lecture 1

> Lecture 2

▼ Assignment 1

**Image Enhancement, Binarization, Morphological Operators**

**Begin:** April 18, 11:00 am  
**Submission deadline:** May 1, 23:00 pm

**Note:** Please form groups of **3 students** and sign up using the **Group Selection** activity.  
You will have time to sing up for a group **until 28th of April!**

Submission Assignment 1

Not available unless: You belong to any group

# Workflow

## Assignment evaluation

- no direct effect on the final grade
- exam admission: at least **5 successfully completed assignments**
- grading on a **pass–fail** principle
- successfully acquired exam admission may be preserved (within 5 years time period) until future exam attendance
- plagiarism will be sanctioned ➡ **work independently**