# 43075-01 Shape modelling and analysis

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## Project Part I: Probabilistic modeling of the femur anatomy

In this first part of the project, you will work individually or in groups of 2 students (recommended) to build, analyze and validate a model of the femur shape. You will be required to submit a project report summarizing the methods you used for modelling, the experiments you performed for validating the model and an analysis of your findings. This project forms the basis for the second part of the project, where you will be using the model for predicting the sex and stature of a person from a given part of a femur.

**Project Guidelines:**

- **Group Size**: You will work ideally in groups of 2. Although we do not recommend it, it is also possible to work alone on the project.
- **Deadlines**: The deadline for submitting the project report is Monday, 24. April 23:59.
- **Project Report**: The project report should be no longer than 6 pages. A template can be found on Adam.
- You may use any resources (including ChatGPT), as long as you properly cite the material and, in case of ChatGPT include the list of prompts that you used together with your submission.

**Guidance**

The task you will work on in this project is a big one, with many pitfalls and difficulties along the way. To guide you along the way, we have split up the task in many subtasks. In each exercise sheet, you will be tasked to solve one of the subtasks. After successful completion of all exercise sheets, you should have a working solution. The solutions to the individual subtasks will be discussed during our meetings on Tuesdays. During these meetings, you will also have the opportunity to ask individual questions and discuss results with the lecturer.

**Grading**    The following criteria will be applied for the grading of your submission:

- Quality of writing, Mechanics (10%)
    - Are the goals of the project clearly and concisely summarized in the Abstract and Introduction?
    - Is the report clearly structured and easy to read?
    - Is everything that is needed to understand the text properly introduced?

- Is the grammar okay? Are there typos? Is the typesetting appropriate?
- Methods (20%)
  - Are the methods adequately summarized and is the theory correct?
  - Are the methods introduced in a sensible order?
  - Does the method description help to understand the experiments and analysis?
- Experiments (20%)
  - Is the experimental setup clear? Is the goal of the experiment clear?
  - Are the experiments sufficient to gain insight into the method?
  - Did the students perform own experiments?
- Analysis (20%)
  - Are the results of the experiments plausible? Are there obvious mistakes?
  - Are effective methods for visualization used to present the results?
  - Are the results adequately analyzed and discussed? Is the analysis sound?
- Results (20%)
  - How well does the method work? Do the shapes look plausible? Do the shapes cover the space adequately?
- Conclusions (10%)
  - How well do the conclusions reflect the results achieved
  - Is there reflection about the weaknesses and potential of the method?
  - Are there reasonable suggestions on how to improve the results (if necessary)

Each aspect will be graded with the grades 3 - 6, where 3 means insufficient, 4 adequate, 5 good and 6 outstanding. The final grade for the project is is computed using the weighted average of the grades of the individual parts.

**Submission Guidelines:**

- The project need to be handed in until Monday, 24. April 23:59 on Adam.
- The report must be in PDF format.
- Along with the report, the source code and, if used, the complete list of all ChatGPT prompts used for generating the report needs to be provided.

*Note: The usual guidelines regarding Plagiarism from the University apply.*

- Guidelines for dealing with Plagiarism