



The Hebrew University of Jerusalem

Syllabus

INTRODUCTION TO IMAGE PROCESSING AND ANALYSIS - 71254

Last update 07-10-2021

HU Credits: 3

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: agro informatics

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: Rehovot

Course/Module Coordinator: yaron Michael

Coordinator Email: yaron.michael@mail.huji.ac.il

Coordinator Office Hours: by appointment

Teaching Staff:

Mr. Yaron Michael,
Mr. Daniel Waiger

Course/Module description:

Learning of selected topics in image processing and analysis at an introductory level.

These include the following topics: Image digitization, mathematical operations on matrices, color representations, data filtering including Fourier transforms and image segmentation. Students learn to apply the material by implementing and investigating image processing algorithms in Python and ImageJ (Fiji).

Course/Module aims:

Learning outcomes - On successful completion of this module, students should be able to:

Proper image acquisition - What are the prerequisites for a proper image/dataset?
Read images into analysis programs and perform mathematical operations on them.

Understand and apply Fourier transform analysis to images.

To create a workflow that allows the extraction of conclusions from experimental images.

Attendance requirements(%):

none

Teaching arrangement and method of instruction: Weekly lectures and discussion, programming in class, and homework assignments.

Course/Module Content:

List of subjects:
Introduction, Digital images
Color Science
Operating on Images

Filtering and Histograms

ImageJ - FIJI

FFT - Fourier analysis

Image Segmentation

Regions of Interest

Colors, and dimensionality reduction

Multi-image processing (Video and multiposition batch)

Image analysis projects

Required Reading:

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Additional Reading Material:

Bioimage Data Analysis Work Flows / Kota Miura, Nataša Sladoje (Editors) (Open access Online Book)

Course/Module evaluation:

End of year written/oral examination 0 %

Presentation 0 %

Participation in Tutorials 0 %

Project work 50 %

Assignments 50 %

Reports 0 %

Research project 0 %

Quizzes 0 %

Other 0 %

Additional information:

Exercises (class and home): 50%

Project: 50%