



University of Jordan

King Abdullah II School for Information Technology
Business Information Systems Department

Special topics on: Digital Image Processing (1903485)

Subject Outline

General Information

- Subject title: Digital Image Processing
- Subject number: 1903485
- Semester and year offered: Semester 1, 2010
- Credit point value: 3
- Subject level: UG (under graduate)
- Name of subject lecturer: Dr. Omar Sultan Al-Kadi
- School and Department: King Abdullah II School for Information Technology (KASIT), Department of Business Information Systems (BIS)

Syllabus

Some of the topics and issues to be covered through out the course:

Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and quantization, Basic gray Level transformations, Histogram Processing, Enhancement using Arithmetic/Logic Operations, Smoothing spatial filters, Combining spatial enhancement methods, Fourier Transform and the Frequency Domain, Smoothing Frequency- Domain Filters, Sharpening Frequency Domain Filters, Homomorphic filtering, Noise Models, Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Inverse Filtering, Minimum Mean square Error (Wiener) Filtering, Constrained Least Square Filtering, Geometric Mean Filtering, Geometric Transformations, Pseudocolor Image Processing, Color Transformations, Color Segmentation, Noise in color Images, Color Image Compression, Image compression Methods, Elements of Information Theory, Error-free Compression, Lossy Compression, Image Compression standards.

Learning Outcomes (Objectives)

To provide a comprehensive knowledge of theoretical background and practical applications of digital image processing techniques, analysis and enhancement both in

the spatial and frequency domains; also to be able to work with different image compression techniques.

Prerequisite

Discrete mathematics

Subject Timetable

Week 1: Introduction to Image Processing

Week 2: Digital Image Fundamentals

Week 3: Digital Image Fundamentals

Week 4: Image Enhancement in the Spatial Domain

Week 5: Image Enhancement in the Spatial Domain (*1st mid-term Exam*)

Week 6: Image Enhancement in the Frequency Domain

Week 7: Image Enhancement in the Frequency Domain

Week 8: Image Restoration

Week 9: Image Restoration

Week 10: Color Image Processing

Week 11: Color Image Processing (*2nd mid-term Exam*)

Week 12: Image Compression

Week 13: Image Compression (*submission of project*)

Week 14: Selected topics on Morphological Image Processing

Week 15: Review

Contacting Subject Lecturer

Subject lecturer: Dr. Omar Sultan Al-Kadi, e-mail: o.alkadi@ju.edu.jo

Office hours:

Date	Sun, Tue and Thu	Mon, Wed
Time	10:00am-11:00am	12:30am-1:30pm

Or send an e-mail to arrange for an appointment.

Subject Resources

Textbook

The material that will be used to cover the *Image Processing Applications* course will be based mainly on the following textbooks:

Digital Image Processing, 3rd/ed

By Rafael C. Gonzalez and Richard E. Woods, Prentice-Hall; 2008

ISBN: 0131687288

Digital Image Processing Using MATLAB, 2nd/ed

By Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, Prentice-Hall; 2009

ISBN: 0982085400

Assessment

There will be one final exam having 50% of the total course grade, and 2 mid-term exams (each 20% of final grade). The remaining 10% is accounted for a group project.

Subject Policy

Feedback on assignments is given on the individual assignment documents and in general discussion of the assignment in class.

a. Examinations

- The final examination will be conducted in a two hours' duration.
- The final examination will comprise short and long questions.

b. Submissions, late penalties, absences etc.

Late submissions are not allowed except when the student can provide an appropriate medical certificate.

c. Special consideration and deferred examinations

In the case of illness, misadventure at the scheduled time of an examination, students should contact the subject lecturer as soon as possible.

d. Supplementary examinations

A supplementary examination is not allowed in this subject. If you miss the first midterm exam for a valid reasons (as described in "b") then your mark will be the average of the second midterm exam and the final exam; if you miss the second midterm exam then your mark will be the average of the first midterm exam and the final exam.

Student responsibility

a. Enrolment

It is the student's responsibility to ensure that they are correctly enrolled in each subject and that the subjects are correct for their course of study.

b. Attendance

Students are expected to attend lectures.

c. Announcements

Announcements made on the subject website or in lectures are deemed to be made to all students.

d. Workload

The bulk of the student workload will be in lecture revision, solving assignment's questions and in laboratory applications.