



Course Specification

Course Name: [Image Processing– 1]

Course Code: [IT441]

I. Basic Course Information

Major or minor element of program: [Both Major & Minor]

Department offering the course: [Information Technology Department]

Academic level: [300 Level]

Semester in which course is offered: [Second (Spring) Semester]

Course pre-requisite(s): [IT 341 - Digital Signal Processing]

Credit Hours: 3

Contact Hours Through:

Lecture	Tutorial*	Practical*	Total
2.5	0.0	1.5	4.0

* 1.5 hours for **either** Tutorial or Practical

Approval date of course specification: [January 2015]

II. Overall Aims of Course

[This course provides an introduction to basic concepts and methodologies for digital image processing in both theoretical and practical aspects, and develops a foundation that can be used as the basis for further study and research in this field.]

III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
[K1,K10,K17,K20]	[I1,I10,I13,I18]	[P12,P13,P18]	[G2,G6,G8]



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IV. Intended Learning Outcomes of Course (ILOs)

a. Knowledge and Understanding

On completing the course, students should be able to:

- K.1 Recognize digital image fundamentals.
- K.2 Describe basic techniques of image enhancement and image restoration.
- K.3 Describe image segmentation techniques and classification assessment methods.
- K.4 Define basic morphological operations.
- K.5 Recognize Remote Sensing platforms as an application field.]

b. Intellectual/Cognitive Skills

On completing the course, students should be able to:

- I.1 Develop the ability to choose the appropriate technique for a given problem.
- I.2 Discriminate between different spatial filters for image enhancement.
- I.3 Discriminate between different filters in frequency domain.
- I.4 Discriminate between different restoration techniques.
- I.5 Discriminate between different segmentation techniques and classification assessment methods.
- I.6 Examine the effect of various Morphological operations on grey level images.]

c. Practical/Professional Skills

On completing the course, students should be able to:

- P.1 Learn the detailed computational procedures of image processing techniques.
- P.2 Execute image processing tool-boxes and any related publicly available software.
- P.3 Execute image processing techniques in real-world applications.]

d. General and Transferable Skills

On completing the course, students should be able to:

- G.1 Improve the oral communication skills through project presentation.
- G.2 Improve team working skills and time management through case studies.
- G.3 Read advanced textbooks and research literature in the image-processing field.]

V. Course Matrix Contents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1-	Introduction: Image Model, Acquisition, Terminologies]	[1]	[K1]	[I1]	[P1,P2]	[]
2-	Histogram manipulation]	[2]	[K2]	[I1]	[P1,P2,P3]	[G1,G2]
3-	Spatial & Frequency Domain Filters]	[2]	[K2]	[I1,I2,I3]	[P1,P2,P3]	[G2]
4-	Image restoration]	[2]	[K2]	[I4]	[P1,P2,P3]	[G2]
5-	Image segmentation]	[3]	[K3]	[I5]	[P1,P2,P3]	[G2,G3]
6-	Image classification]	[1]	[K3]	[I5]	[P1,P2,P3]	[G2,G3]
7-	Morphological image processing]	[1]	[K4]	[I6]	[P1,P2,P3]	[G2,G3]
8-	Application Field]	[1]	[K5]	[]	[P3]	[G3]
	Net Teaching Weeks	13				



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VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours*
1	Introduction: ImageModel, Image Acquasition, Terminologies	[2.5]	[2.5]	
2	Histogram manipulation	4	2.5	1.5
3	Histogram manipulation	4	2.5	1.5
4	Spatial Filters	4	2.5	1.5
5	Frequency Domain Filters	4	2.5	1.5
6	Image restoration	4	2.5	1.5
7	Midterm Exam			
8	Image restoration	4	2.5	1.5
9	Adaptive Filters	4	2.5	1.5
10	Boundary based Image segmentation	4	2.5	1.5
11	Region based Image segmentation	4	2.5	1.5
12	Image classification	4	2.5	1.5
13	Morphological image processing	4	2.5	1.5
14	Remote Sensing as an application field	4	2.5	1.5
15	Final Exam			
Total Teaching Hours		51	33	18

* No Practical/Tutorial during the first week of the semester

VII. Teaching and Learning Methods

Teaching/Learning Method	Selected Method	Course ILOs Covered by Method (By ILO Code)			
		K & U	Intellectual Skills	Professional Skills	General Skills
Lectures & Seminars	[]	[K1,K2,K3,K4,K5]	[I1,I2,I3,I4,I5,I6]	[P1,P2]	[]
Tutorials	[]	[]	[]	[]	[]
Computer lab Sessions	[]	[]	[]	[]	[]
Practical lab Work	[]	[]	[]	[P1,P2,P3]	[G2]
Reading Materials	[]	[]	[I1]	[P3]	[G3]
Web-site Searches	[]	[]	[]	[]	[]
Research & Reporting	[]	[]	[I1]	[P3]	[G3]
Problem Solving / Problem-based Learning	[]	[]	[I1]	[P1,P3]	[]
Projects	[]	[]	[]	[P1,P2,P3]	[G1,G2,G3]
Independent Work	[]	[]	[]	[]	[]
Group Work	[]	[]	[]	[]	[G1,G2]
Case Studies	[]	[]	[]	[]	[]
Presentations	[]	[]	[]	[]	[G1]
Simulation Analysis	[]	[]	[]	[]	[]
Others (Specify):	[]	[]	[]	[]	[]



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VIII. Assessment Methods, Schedule and Grade Distribution

Assessment Method	Selected Method	Course ILOs Covered by Method (By ILO Code)				Assessment Weight / Percentage	Week No.
		K & U	I.S.	P.S.	G.S.		
Midterm Exam	[]	[K1,K2]	[I1,I2,I3]	[]	[]	[15%]	7
Final Exam	[]	[K1,K2,K3,K4,K5]	[I1,I2,I3,I4,I5,I6]	[P1]	[]	60%	15
Quizzes	[]	[K1,K2,K3,K4,K5]	[I1,I2,I3,I4,I5]	[P1,P2]	[]	[5%]	[5,9]
Course Work	[]	[]	[]	[]	[]	[]	[]
Report Writing	[]	[]	[]	[]	[]	[]	[]
Case Study Analysis	[]	[]	[]	[]	[]	[]	[]
Oral Presentations	[]	[]	[]	[]	[G1]	[]	[]
Practical	[]	[]	[I1,I2,I3,I4,I5]	[P1,P2,P3]	[]	[15%]	[Every week]
Group Project	[]	[]	[I1,I2,I3,I4,I5]	[P1,P2,P3]	[G1,G2,G3]	[5%]	[13]
Individual Project	[]	[]	[]	[]	[]	[]	[]
Others (Specify):	[]	[]	[]	[]	[]	[]	[]

IX. List of References

Essential Text Books	• [Digital image processing ,Rafael C. Gonzalez and Richard E.Woods ,second edition,2008]
Course notes	• [Handouts to the students part by part]
Recommended books	• [Digital Image Processing, Kenneth R. Castlman, Prentice-Hall, Inc., 1996.]
Periodicals, Web sites, etc ...	• [Related Web Sites]

X. Facilities required for teaching and learning

[List the facilities required
• Computer Lab
• DataShow]

Course coordinator:[Prof. Hoda Mohamed Onsi]

Head of Department: Prof. Hesham El Mahdy

Date: [January 2015]