



Course Specification

(Bachelor)

Course Title: **Digital Image Processing**

Course Code: **CENX 465**

Program: **B.S. in Computer Engineering**

Department: **Department of Computer Engineering**

College: **College of Computer and Information Sciences**

Institution: **King Saud University**

Version: *Course Specification Version Number*

Last Revision Date: *Pick Revision Date.*

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A. General information about the course:

1. Course Identification

1. Credit hours: (1 hours)

2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
B. ☐ Required ☒ Elective

3. Level/year at which this course is offered: (Level 9 and 10)

4. Course general Description:

Covers quantitative models of imaging systems, spatial domain and frequency domain methods, digital filter design for image enhancement and restoration, edge detection, image denoising, image enhancement, image restoration, image compression, and image representation and description.

5. Pre-requirements for this course (if any):

Digital Signal Processing, CENX 352

6. Co-requirements for this course (if any):

7. Course Main Objective(s):

The main objective of the course is to provide an understanding digital images and digital image processing along with filtering, denoising and compression.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4 hours per week	100%
2	E-learning		
3	Hybrid - Traditional classroom - E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
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1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Describe basic image processing functions such as sampling, quantization and interpolation.	1		
2.0	Skills			
2.1	Perform intensity transformations and histogram processing.	2		
2.2	Perform filtering in the spatial domain.	2		
2.3	Perform filtering in the spectral domain.	2		
3.0	Values, autonomy, and responsibility			
3.1	Apply image restoration and enhancement.	6		
3.2	Apply compression and decompression of digital images.	6		

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction and background	12
2.	Intensity transformation and histogram processing	10
3.	Image enhancement in the spatial domain	12
4.	Image enhancement in the frequency domain	10





5.	Image restoration	6
6.	Image compression	6
7.	Review and evaluation	
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Examination (1)	6	20%
2.	Midterm Examination (2)	12	20%
3.	Assignments and Quizzes	Bi-weekly	20%
4.	Final Exam	End	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Digital Image Processing, Gonzalez, R. C. and Woods, R. E., Prentice Hall, 3rd Ed., 2008.
Supportive References	Handbook of Image and Video Processing, Bovik, A., Academic Press, 2000.
Electronic Materials	Website of the instructor, LMS http://www.imageprocessingplace.com/ http://www.mathworks.com/help/pdf_doc/matlab/getstart.pdf
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room with number of seats enough to accommodate enrolled students.
Technology equipment (projector, smart board, software)	Overhead projector with required software to facilitate presentations on smart board.
Other equipment (depending on the nature of the specialty)	



F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Department Council	Course reports are evaluated by the Department Council.
Effectiveness of Students assessment	Faculty-Peer Review	Final examination is moderated.
Quality of learning resources	Students	Indirect – Edu-gate survey.
The extent to which CLOs have been achieved	Students	Attainment level of every CLO is measured directly.
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	