The University of Jordan

Accreditation & Quality Assurance Center

COURSE Syllabus

Document Analysis & Recognition (1904484)

1	Course title	Document Analysis & Recognition
2	Course number	1904484
3	Credit hours (theory, practical)	3 - theory
	Contact hours (theory, practical)	3 - theory
4	Prerequisites/co requisites	Discrete Mathematics (1901101), Theory of Algorithms (1901341)
5	Program title	Business Information Technology
6	Program code	4
7	Awarding institution	The University of Jordan
8	Faculty	King Abdullah II School for Information Technology
9	Department	Department of Information Technology
10	Level of course	4th year
11	Year of study and semester (s)	4, semester 1
12	Final Qualification	Bachelor (B.Sc.)
13	Other department (s) involved in teaching the course	none
14	Language of Instruction	English
15	Date of production/revision	production: 1-2-2015/ revision :21-01-2021/ revision :31-01-2023
16	Required/ Elective	Required

17. Course Coordinator: Dr. Omar Al-Kadi

Office numbers: 08
Office Hours: 11:30-12:30 Everyday
Office extension: 22623
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18. Other instructors:

None

19. Course Description:

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.

20. Course aims and outcomes:

A. Course aims:

On completion of this course, students should be able to:

- Cover the basic theory and algorithms that are widely used in digital image processing
- Gain experience in applying image processing algorithms for document analysis and recognition applications
- Familiarize with MATLAB Image Processing Toolbox

B. Intended Learning Outcomes (Mapped directly to KPI ➔ ILO≡KPI):

On successfully completing the module, the students are expected to have gained good knowledge of:

Knowledge:

A) Apply principle processing and analysis techniques for image document enhancement both in the spatial and frequency domains. **[SO 1]**

B) Being able to determine the type of distortion in an image, and apply appropriate filtering techniques for image enhancement. **[SO 2]**

C) Understanding 2D Fourier transform concepts, and their use in frequency domain filtering. **[SO 1]**

D) Understand how to represent an image using different colour models and how to convert from one colour model to another for improved visualization **[SO 2]**

E) Applying basic image restoration techniques and noise filtering **[SO 2]**

F) Applying JPEG image compression and image morphological operations **[SO 2]**

Professional Skills

G) Demonstrate how to solve practical problems with some basic image processing techniques **[SO 5]**

H) Demonstrated teamwork and communication skills through a course project **[SO 3]**

Teaching and Learning Methodology:

Method	Lecture	Demo	Laboratory
Learning outcomes	A,B,C,D,E &F	A,B,C,E &F	G+H
Assessment	Exams, Quizzes, Assignment, Programming project		

21. Topic Outline and Schedule:

Week	Topics	Achieved ILO	Program SOs	Evaluation	Reference
1	Introduction to Image Processing	A	1	T: Lecture; L: Reading lecture notes & Ch1; A: In class questions	Chapter1
2	Digital Image Fundamentals	A	1	T: Lecture; L: Reading lecture notes & Ch2; A: In class questions	Chapter2
3	Digital Image Fundamentals	G	1	T: Lecture; L: Reading lecture notes & Ch2; A: In class coding practice	Chapter2
4	Intensity Transformation and Spatial Filtering	B	2	T: Lecture; L: Reading lecture notes & Ch3; A: Homework assignments	Chapter 3
5	Intensity Transformation and Spatial Filtering	G	2	T: Lecture; L: Reading lecture notes & Ch3; A: In class coding practice	Chapter 3
6	Image Enhancement in the Frequency Domain	C	2	T: Lecture; L: Reading lecture notes & Ch4; A: In class questions	Chapter4
7	Midterm exam				
8	Image Enhancement in the Frequency Domain	G	2	T: Lecture; L: Reading lecture notes & Ch4; A: In class coding practice	Chapter4
9	Image Restoration	E	1	T: Lecture; L: Reading lecture notes & Ch5; A: Quiz	Chapter5
10	Image Restoration	G	1	T: Lecture; L: Reading lecture notes & Ch5; A: In class coding practice	Chapter5
11	Color Image Processing	D	2	T: Lecture; L: Reading lecture notes & Ch6; A: In class questions	Chapter6
12	Color Image Processing	G	2	T: Lecture; L: Reading lecture notes & Ch6; A: In class coding practice	Chapter6
13	Image Compression	F	2	T: Lecture; L: Reading lecture notes & Ch7; A: Homework assignments	Chapter7

14	Selected topics on Morphological Image Processing	F	2	T: Lecture; L: Reading lecture notes & Ch9; A: Homework assignments	Chapter٩
15	Programming project submission	H	3	-	-

22. Teaching Methods and Assignments:

Development of ILOs is promoted through the following <u>teaching and learning methods</u>:
Lecture, tutorials, lab and presentations

23. Evaluation Methods and Course Requirements:

Teaching (T) Strategies
Class contact is 3 Hours per week. The Course will be delivered using different means like lecture, presentations, seminars, discussion and programming labs.

Learning (L) Methods
Students attend classes, ask questions and participate in discussions, do the home works, present the assignments and demo their works. A student will use the lab and select a programming language to implement the assignments. Students will access the e-learning platform for more instruction and supported learning materials

Assessment (A) Methods
There will be several assessment methods of evaluation the performance of the students such as attending and class participation, grading the homework, quizzes and assignments; conducting the Midterm and the Final Exams. Every student is expected to completely adhere to the assignments and project strict deadlines, absolutely no exceptions will be given.

24. Course Policies:

A- Attendance policies:

Maximum allowable absence 15% of number of Lectures/Semester

B- Absences from exams and handing in assignments on time:

It is the student's responsibility to ensure that he/she is aware of all assignments, announcements and contents of missed sessions

C- Health and safety procedures:

Practical sessions need labs which are suitable adjustable chairs, safe computers and wires should be well organized.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

It is the student's responsibility to ensure that he/she is adhere with cheating, plagiarism, misbehavior

E- Grading policy:

Intended (Tentative) Grading Scale:

Range	LG	الحرف	Range	LG	الحرف	Range	LG	الحرف
91 - 100	A	أ	74 - 77	B-	ب-	56 - 60	D+	د+
86 - 89	A-	أ-	70 - 73	C+	ج+	50 - 55	D	د
82 - 85	B+	ب+	66 - 69	C	ج	45 - 49	D-	د-
78 - 81	B	ب	61 - 65	C-	ج-	0 - 44	F	هـ

Grading and Evaluation Criteria: 100 points distributed as follows:

Weight	Criteria	Comments
30%	Midterm Exam (Automated)	TBA (in due course)
20%	Quizzes and Assignments	TBA (in due course)
50%	Final Exam	TBA (in due course)

F- Available university services that support achievement in the course:

Computer Labs.

25. Required equipment:

Personal computers in a lab, Data show, MATLAB 2022

26. References:

- Digital Image Processing, 4th/ed By Rafael C. Gonzalez and Richard E. Woods, Prentice-Hall; 2017 ISBN: 9780133356724
- Digital Image Processing Using MATLAB, 2nd/ed By Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, Mc Graw Hill India; 2010 ISBN: 9780070702622

27. Additional information:

- Tardiness and/or absenteeism will have a negative impact on the course grade.
  - الامتناع المدبر عن حضور المحاضرات أو الدروس أو عن الأعمال الاخرى التي تقضي الأنظمة بالمواظبة عليها ، وكل تحريض على هذا الامتناع سوف يؤدي الى حرمان الطالب من المادة المعنية.
  - في حالة التغيب عن الامتحانين الأول و الثاني لن يكون هناك امتحان تعويضي الا في حالة وجود عذر وحالة طارئة من المستشفى. على الطالب براز العذر لمدرس المادة في فتره لا تتجاوز الثلاثة ايام من تاريخ الامتحان, وللمدرس الحق في قبول او رفض العذر , وحسب التعليمات.
- Concerns or complaints should be expressed in the first instance to the module lecturer; if no resolution is forthcoming then the issue should be brought to the attention of the module coordinator (for multiple sections) who will take the concerns to the module representative meeting. Thereafter problems are dealt with by the Department Chair and if still unresolved the Dean and then ultimately the Vice President. For the final complaints, there will be a committee to review grading the final exam.

- For more details on University regulations please visit http://www.ju.edu.jo/rules/index.htm

Name of Course Coordinator: Dr. Omar Al-Kadi   Signature: O.K.   Date: 31-01-2023

Head of curriculum committee/Department: Signature:

Head of Department: Signature:

Head of curriculum committee/Faculty: Signature:

Dean: Signature:

Copy to:
Head of Department
Assistant Dean for Quality Assurance