



Jordan University of Science and Technology
Faculty of Computer & Information Technology
Computer Science Department

CS783 Advanced Computer Vision - JNQF Level: 6

Second Semester 2023-2024

Course Catalog

3 Credit Hours. This course introduces students to computer vision techniques and applications. It is primarily concerned with the problem of capturing and making sense of digital images. The field draws heavily on many major subjects including digital image processing, artificial intelligence, feature extraction and selection, image classification and recognition, and scene understanding. This course also introduces deep learning with neural networks which are currently being used in the development of real-world computer vision systems that mimic the capabilities of the human eye-brain system. Students will learn and develop the intuitions of computer vision methods in class as well as hands-on experience to solve real-life vision problems. A research-oriented project will also offer teamwork experience on computer vision challenges and recent directions.

Teaching Method: On Campus

Text Book

Title	Computer Vision: Algorithms and Applications
Author(s)	Richard Szeliski
Edition	2nd Edition
Short Name	Ref #1
Other Information	2021

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	Digital Image Processing	Gonzalez, R. C. and Woods, R. E.	4th Edition	2017

Instructor

Name	Dr. Ahmad Alzubi
Office Location	-

Office Hours	Sun : 11:30 - 13:30 Mon : 11:00 - 13:00 Tue : 11:30 - 13:30 Wed : 11:00 - 13:00
Email	agalzubi@just.edu.jo

Class Schedule & Room
Section 2: Lecture Time: Tue : 13:30 - 16:30 Room: G2121

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Introduction to computer vision	From Ref #1
Weeks 2, 3	Image formation	From Ref #1
Weeks 4, 5	Image processing	From Ref #1, From Ref #2
Week 6	Model fitting and optimization	From Ref #1
Weeks 7, 8, 9	Deep Learning	From Ref #1
Weeks 10, 11, 12, 13, 14	Recognition (Instance recognition, Image classification, Object detection, Semantic segmentation)	From Ref #1
Week 15	Term-Paper Results and Discussion	From Ref #1, From Ref #2

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Understand the theoretical and practical aspects of human and machine vision systems and the importance of computing with images [1MSO2] [1L6K2, 1L6S2]	5%	
Describe the foundation of image formation, analysis, processing, matching, and alignment with a probabilistic perspective [1MSO2] [1L6K2, 1L6S2]	10%	
Grasp the principles of deep neural networks [1MSO2] [1L6K2, 1L6S2]	10%	

Work on various computer vision techniques including object and scene recognition, image classification, semantic segmentation, and video understanding [1MSO2] [1L6K2, 1L6S2]	25%	
Understand feature detection and matching approaches necessary to build various computer vision applications [1MSO2] [1L6K2, 1L6S2]	10%	
Contribute as a member of a research team, collaborating on contemporary computer vision topics to produce a research term-paper and deliver an oral presentation that explains the research [1MSO4, 1MSO5] [1L6K2, 1L6S1, 1L6C2]	40%	

Relationship to Program Student Outcomes (Out of 100%)										
SO1	SO2	SO3	SO4	SO5	SO6	MSO1	MSO2	MSO3	MSO4	MSO5
							60		20	20

Relationship to NQF Outcomes (Out of 100%)			
L6K2	L6S1	L6S2	L6C2
43.33	13.33	30	13.33

Evaluation	
Assessment Tool	Weight
Midterm Exam	20%
Final Exam	40%
Term-Paper Project	30%
Term-Paper Progress Reports	10%

Policy	
Attendance	Attendance is very important for the course. In accordance with the university policy, students missing more than 20% of total classes are subject to failure. Penalties may be assessed without regard to the student's performance. Attendance will be recorded at the beginning or end of each class.
Assignments	Cheating is prohibited under JUST strict laws. No late submissions are accepted.
Exams	The format for the exams is generally (but NOT always) as follows: General calculations, Multiple-Choice, True/False, Analyze a Problem, etc.

Date Printed: 2024-06-02