

Course Specifications

Course Title:	Computer Vision
Course Code:	ICS 432
Program:	Information and Computer Sciences
Department:	CSI
College:	Science in AL Zulfi
Institution:	Majmaah University

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A. Course Identification

1. Credit hours: 3			
2. Course type			
a.	University <input type="checkbox"/>	College <input type="checkbox"/>	Department <input checked="" type="checkbox"/>
b.	Required <input type="checkbox"/>	Elective <input checked="" type="checkbox"/>	Others <input type="checkbox"/>
3. Level/year at which this course is offered: 7 th Level			
4. Pre-requisites for this course (if any): Artificial Intelligence ICS411			
5. Co-requisites for this course (if any): NA			

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	48	80 %
2	Blended	6	10 %
3	E-learning	6	10 %
4	Correspondence		
5	Other		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	30
2	Laboratory/Studio	20
3	Tutorial	10
4	Others (Presentations & group discussions)	
	Total	60
Other Learning Hours*		
1	Study	20
2	Assignments	15
3	Library	10
4	Projects/Research Essays/Theses	5
5	Others (seminars)	
	Total	50

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

In this class, students will learn the basics of modern computer vision. The first major part of the course will cover fundamental concepts such as image formation, image filtering, edge detection, texture description, feature extraction and matching, and grouping and fitting. The second part will focus on visual recognition. We will study state of the art approaches to

object recognition and detection, examine the interplays between vision and language, and learn to model human pose and activity. We will cover recently popular techniques such as convolutional and recurrent neural networks. We will also discuss a few topics from the most recent computer vision conferences. The course format will include lectures, written homework assignments, programming homework assignments, and exams.

2. Course Main Objective

- Review image processing techniques for computer vision
- Explain shape and region analysis
- Illustrate Hough Transform and its applications to detect lines, circles, ellipses
- Contrast three-dimensional image analysis techniques, motion analysis and applications of computer vision algorithms

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Understand and master basic knowledge, theories and methods in image processing and computer vision.	a1
1.2	Identify, formulate and solve problems in image processing and computer vision.	c3
1.3	Analyze, evaluate and examine existing practical computer vision systems.	a1, c3
2	Skills :	
2.1	Design and develop practical and innovative image processing and computer vision applications or systems.	b2
2.2	Group works and learning time management	b3
2...		
3	Competence:	
3.1	Conduct themselves professionally and responsibly in the areas of computer vision image processing and deep learning	a1, c1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to computer vision	4
2	Matlab tutorial and linear algebra review	4
3	Filtering and texture	8
4	Feature detection and description	8
5	Edges, lines, circles and segments	8
6	Transformations and multiple views	8
7	Introduction to recognition, conventional neural networks, object recognition, detection, and segmentation	12
8	Introduction to computer vision	4
9	Sequential data: Language and motion	4
Total		60

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge		
1.1	Understand and master basic knowledge, theories and methods in image processing and computer vision.	Lectures, Lab demonstrations Case studies Individual presentations	Written Exam Homework assignments Class & lab Activities Quizzes
2.0	Skills		
2.1	Design and develop practical and innovative image processing and computer vision applications or systems.	Group discussions, Lab demonstrations, Brainstorming Presentations	Home works and assignments
3.0	Competence		
3.1	Conduct themselves professionally and responsibly in the areas of computer vision image processing and deep learning	Group discussions, Case Studies, Brainstorming Presentations	Written Exam Homework assignments Class & lab Activities Quizzes

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First written mid-term exam	6	10%
2	Second written mid-term exam	12	10%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After Every chapter	10%
5	Practical exam	15	20%
6	Final exam	16	40%
	Total		100%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Office hours: Sun: 1-3, Mon. 12-1, Wed. 12-1

Office call: Sun. 12-1 and Wed 9-10

Email: y.qawqzeh@mu.edu.sa

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Computer Vision: Algorithms and Applications. Richard Szeliski (2010). Springer. ISBN 978-1-84882-935-0
Essential References Materials	Computer Vision: A Modern Approach (2nd Edition). David A. Forsyth and Jean Ponce (2011). ISBN-13: 978-0136085928
Electronic Materials	http://szeliski.org/Book/
Other Learning Materials	Video and presentations that available with the instructor

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and Laboratories are available at the college of science at Al-Zulfi.
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart Boards, software, data shows and AV technological resources are available.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	N/A

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	