هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	Computer Vision
Course Code:	CS 461
Program:	Computer Science
Department:	Computer Science
College:	College of Computer and Information Sciences
Institution:	Majmaah University

Table of Contents

A. Course Identification

1. Credit hours: 3
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☐ Elective ☑
3. Level/year at which this course is offered: Track
4. Pre-requisites for this course (if any)**: CS 231**
5. Co-requisites for this course (if any)**:**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	44	%100
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	22
2	**Laboratory/Studio**	22
3	**Tutorial**	
4	**Others** (specify)	
	Total	44

B. Course Objectives and Learning Outcomes

1. Course Description

This course provides an introduction to computer vision, including fundamentals of image formation, camera imaging geometry, feature detection and matching, stereo, motion estimation and tracking, image classification, scene understanding, and deep learning with neural networks. Implementation of various algorithms will be done in python language.

2. Course Main Objectives

1. To introduce to the theoretical and practical aspects of computing with images
2. To cover the techniques of image formation, measurement, and analysis
3. To expose to the common methods for robust image matching and alignment
4. Highlight the geometric relationships between 2D images and the 3D world
5. Giving exposure to object and scene recognition and categorization from images

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1		
1.2		
1.3		
1...		
2	**Skills :**	
2.1	CLO1: Students understand the foundation of image formation, measurement, and analysis	S4
2.2	CLO2: Student's Be familiar with both the theoretical and practical aspects of computing with images	S1
2.3	CLO3: Students understand how to track, identify and recognize objects from images	S1
2...	CLO4: Students Understand how deep learning models have evolved from a generalization of traditional computer methods	S2
3	**Values:**	
3.1		
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Image formation and perception, image representation	2
2	Image geometric transformations, image registration	2
3	Edge detection, image segmentation	2
4	Linear filters, Binary image analysis,	2
5	Background subtraction	2
6	Object recognition, template matching, classification	2
7	Object detection and tracking	2
8	Camera models, stereo vision	2
9	Supervised classification algorithms	2
10	Visual attributes, Dimensionality reduction	2
11	Deep learning	2
Total		22

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 and Understanding**		
1.1			
1.2			
…			

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.0	**Skills**		
2.1	CLO1: Students understand the foundation of image formation, measurement, and analysis	Classroom Teaching	Class Test, Mid Exam, Final Exam
2.2	CLO2: Students Be familiar with both the theoretical and practical aspects of computing with images	Classroom Teaching	Class Test, Mid Exam, Final Exam
…	CLO3: Students understand how to track, identify and recognize objects from images	Classroom Teaching	Class Test, Mid Exam, Final Exam
	CLO4: Students Understand how deep learning models have evolved from a generalization of traditional computer methods	Classroom Teaching	Class Test, Mid Exam, Final Exam
3.0	**Values**		
3.1			
3.2			
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes	Week 5, 10,13	20 %
2	Assignments	Week 7, 13	20%
3	Midterm Exam	Week 8	20 %
4	Final Exam	Week 16	40 %
5			
6			
7			
8			

***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 :
Each student is allotted to an academic advisor for guidance and counseling.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Computer Vision: Algorithms and Applications by Richard Szeliski, Springer,2011, ISBN 978-1-84882-934-3

Essential References Materials	Computer Vision, A Modern Approach, Forsyth and Ponce, 2nd ed., 2011
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom, laboratories
Technology Resources (AV, data show, Smart Board, software, etc.)	PC with Windows/Linux, LCD Projector, Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Internet

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Final Exam Answer Scripts Verification	Review Committee member	Review
Course Feedback	Students	Survey

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	