



Course Specifications

Institution:	College of Science at Az Zulfi
Academic Department :	Department of Computer Science and Information
Programme :	Computer Science and Information Program
Course :	Computer Vision
Course Coordinator :	.....
Programme Coordinator :	Associate Prof. Yosry Azzam
Course Specification Approved Date :	22./12/ 1435 H



A. Course Identification and General Information

1 - Course title :	Computer Vision	Course Code:	CSI 424
2. Credit hours :	3 credit hours (2 lecture + 2 Laboratory)		
3 - Program(s) in which the course is offered:	Computer Science & Information Program		
4 – Course Language :	English		
5 - Name of faculty member responsible for the course:			
6 - Level/year at which this course is offered :	Elective course – 2014/2015		
7 - Pre-requisites for this course (if any) :	<ul style="list-style-type: none"> N/A 		
8 - Co-requisites for this course (if any) :	<ul style="list-style-type: none"> N/A 		
9 - Location if not on main campus :	(College of Science at Az Zulfi)		
10 - Mode of Instruction (mark all that apply)			
A - Traditional classroom	<input checked="" type="checkbox"/>	What percentage?	80 %
B - Blended (traditional and online)	<input checked="" type="checkbox"/>	What percentage?	5 %
D - e-learning	<input type="checkbox"/>	What percentage?	5 %
E - Correspondence	<input type="checkbox"/>	What percentage? %
F - Other	<input checked="" type="checkbox"/>	What percentage?	10 %
Comments :			

B Objectives

What is the main purpose for this course?

The goal of this course is to covers fundamental topics in computer vision. The course will provide an introduction to image formation, image processing, feature detection, segmentation, multiple view geometry and 3D reconstruction, motion, face detection, object recognition and classification. As such, after completing this course, the students will learn the basics of computer vision and some of the state-of-the-art techniques. They will be able to write programs that can perform image segmentation, image matching, object detection or recognition, and applications such as content-based image retrieval or construction of panoramas. Upon completion of the course they should be able to take an internship or job with a vision company or research lab doing vision or to participate in undergraduate research leading to potential graduate level research.





Briefly describe any plans for developing and improving the course that are being implemented :

1. Using group discussion through the internet with course attending students.
2. Updating the materials of the course to cover the new topics of the field.

C. Course Description

1. Topics to be covered

List of Topics	No. of Weeks	Contact Hours
1. Introduction: What is computer vision? The Marr paradigm and scene reconstruction, Other paradigms for image analysis	1	4
2. Image Formation : Image Geometry, Radiometry and Digitization	2	8
3. Binary Image Analysis and Segmentation : Properties, Digital geometry and Segmentation	2	8
4. Image Processing for Feature Detection and Image Synthesis: Edge detection, corner detection, Line and curve detection, SIFT operator, Image-based modeling and rendering, a Mosaics, snakes	3	12
5. Stereo : Introduction to Stereo Vision, Applications	1	4
6. Shape from X : Shape from shading, Photometric stereo, Texture and Occluding contour detection	2	8
7. Motion Analysis: Motion detection and optical flow Structure from motion	2	8
8. Object Recognition: Model-based methods, Appearance-based methods and Invariants	2	8



2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	30	.....	30	.....	.....	60
Credit	30	.....	15	.....	.....	45

3. Additional private study/learning hours expected for students per week.

5

The private self-study of my student is crucial for this course. It includes:

- Reading carefully the topics in the textbook or reference book,
- Searching the websites related to the course,
- Solving the exercises that are assigned,
- Discussing the course topics with the instructor in his office hours,
- Watching related video lectures.

The total workload of the student in this course is then: $60 + 5 * 15 = 135$ work hours.



3. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Have an understanding of the theoretical and practical capabilities of Computer Vision.	Lectures Lab	Written Exam Homework
1.2	Have a knowledge of common Computer Vision and Image Interpretation algorithms.	demonstrations Case studies	assignments Lab assignments
1.3	Have an understanding of the design of algorithms.	Individual presentations	Class Activities Quizzes
1.4	Be able to formulate solutions to problems in Computer Vision.		
2.0	Cognitive Skills		
2.1	Students will be able to implement fundamental spatial filtering algorithms using correlation and convolution techniques	Lectures Lab demonstrations Case studies	Written Exam Homework assignments Lab assignments
2.2	Choose the appropriate technologies, algorithms, and approaches for the related issues.	Individual presentations	Class Activities Quizzes
2.3	Students will be able to segment objects in an image based on texture and color features	Brainstorming	
2.4	Attempt to generate new ideas and innovations in cloud computing.		
3.0	Interpersonal Skills & Responsibility		
3.1	Work in a group and learn time management.	Small group discussion	Written Exam Homework
3.2	Learn how to search for information through library and internet.	Whole group discussion	assignments Lab assignments
3.3	Present a short report in a written form and orally using appropriate scientific language.	Brainstorming Presentation	Class Activities Quizzes
4.0	Communication, Information Technology, Numerical		
4.1	Communicate with teacher, ask questions, solve problems.	Small group discussion	Written Exam Written Exam
4.2	Use Information technology and computer skills to	Whole group	Homework





	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
	gather information about a selected topic.	discussion	assignments
4.3	Operate questions during the lecture, work in groups, and communicate with each other and with instructor electronically, and periodically visit the sites which the instructor recommends.	Brainstorming Presentation	Lab assignments Class Activities Quizzes
5.0	Psychomotor		
	N/A		

5. Schedule of Assessment Tasks for Students During the Semester:

	Assessment task	Week Due	Proportion of Total Assessment
1	First written mid-term exam	6	15%
2	Second written mid-term exam	12	15%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After every chapter	10%
5	Research about presented topics	Every two weeks	10%
6	Final written exam	16	40%
	Total		100%





D. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

1. 6-office hours per week in the lecturer schedule.
2. The contact with students by e-mail , mobile, office telephone and website.

E. Learning Resources

1. List Required Textbooks :

Computer Vision: A Modern Approach by D. A. Forsyth and J. Ponce, Prentice Hall, Upper Saddle River, N.J., 2003.

2. List Essential References Materials :

Digital image processing. by Willian K. Pratt. 2007.
Handbook of Computer Vision Algorithms in Image Algebra by Gerhard X. Ritter; Joseph N. Wilson CRC Press, CRC Press LLC.

3. List Recommended Textbooks and Reference Material :

- None

4. List Electronic Materials :

Determines as the course is going on.

5. Other learning material :

- Video and presentations that available with the instructor

F. Facilities Required

1. Accommodation

- Classrooms





<ul style="list-style-type: none">• Computer Labs
2. Computing resources <ul style="list-style-type: none">• Smart Board
3. Other resources <ul style="list-style-type: none">• None

G. Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching: <ul style="list-style-type: none">• Analysis of students' results.• Observation during work.• Students' evaluations.• Colleagues' evaluations.• Evaluation questionnaire filled by the students.• Interview a sample of students enrolled in the course to take their opinions.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor : <ul style="list-style-type: none">• Self-assessment.• External evaluation.• Periodic review of course (the Commission of study plans).
3 Processes for Improvement of Teaching : <ul style="list-style-type: none">• Taking into account the recommendations yielded from the internal review of the course.• Guidelines about course teaching provided by the study plans commission.• Department Guidelines about faculty member performance on the basis of direct observation.• Training and development.• Workshops to improve the educational process.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement : <ul style="list-style-type: none">• Comparison of the course to its counterparts offered in similar departments.• Periodic revision of the course description by a faculty member.• Periodic revision of course description by the study plans and schedules





Commission.

- Update learning resources related to the course to ensure that the course is kept up with developments in the field.
- Make use of statistical results of course evaluation made by students to improve and develop the course.
- Giving the opportunity for students to express their opinions about what is taught and receive suggestions and study their effectiveness.

Course Specification Approved

Department Official Meeting No (.....) Date ... / / *H*

Course's Coordinator

Name :

Signature :

Date : .../ ... / *H*

Department Head

Name : Associate Prof. Yosry Azzam

Signature :

Date : .../ ... / *H*

