

CS-605 (Computer Vision and Interactive Computer Graphics)

Second Semester

Course Description

Course Code Number	CS-605	Course Title	Computer Vision and Interactive Computer Graphics
Semester Hours	Total 3 hours per week Lecture 1 hour per week Lab 2 hours per week	No. of Credit Units	3
Prerequisite	CS-406 , CS-501	Course Coordinator	Dr. Ah Nge Htwe Faculty of Computer Science
Course Length	15 Weeks	Type of Instruction	Lecture + Lab

Course Objective

The objective of this course is to provide the concepts of computer vision techniques and develop programs in image enhancing, classification, recognition and analysis. This course also intends to provide the basic concept of deep learning.

Course Outline

This course provides an introduction to computer vision including fundamentals of image formation, camera imaging geometry, feature detection and matching, stereo correspondence, motion estimation, image classification and recognition and develops basic methods for applications that include image filtering, feature matching and boundary detection.

Learning Outcomes

Upon completion of this course, the student will be able to:

- be familiar with both the theoretical and practical aspects of computing with images;
- have described the foundation of image formation, measurement, and analysis;
- have implemented common methods for robust image matching and alignment;
- understand the geometric relationships between 2D;
- have gained exposure to object and scene recognition and categorization from images;
- get practical skills necessary to build computer vision applications.

Text Book

[1] Computer Vision: Algorithms and Applications by Richard Szeliski, 2010.

Reference Books

[1] Computer Vision by Shapiro and Stockman, Prentice-Hall, 2001.

[2] Computer Vision: A Modern Approach (Second Edition) by David Forsyth and Jean Ponce Pearson, 2012.

Course Organization

Student participation in this course will involve the following activities:

- Attending the lectures
- Lab
- Moodle Test
- Tutorial
- Quiz
- Assignments
- Presentation
- Exam

Assessment Plan for the Course

Examination	50%
Tutorial	10%
Project / Practical	10%
Quiz + Moodle	10%
Presentation + Assignment	10%
Class Participation	10%

Tentative Lecture Plan

CS- 605 : **Computer Vision and Interactive Computer Graphics**

Periods : 45 periods for 15 weeks (3 periods per week)

No.	Topics	Week	Remark
	Image Formation		Chapter (2)
1.	Cameras and optics Light and color	Week 1	
	Image Processing and Filtering		Chapter (3) and (10)
2.	Point operators Linear filtering	Week 2+3	
3.	More neighborhood operators Fourier transforms	Week 4	
	Feature Detection and Matching		Chapter (4)
4.	Points and patches Feature matching Edges detection	Week 5 + 6	
5.	Lines Hough transform	Week 7	

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	Segmentation		Chapter (5)
6.	Active contours Split and merge Mean shift and mode finding	Week 8 + 9	
	Structure from motion		Chapter (7) and (11)
7.	Epipolar geometry and structure from motion	Week 10 +11	
	Recognition		Chapter(14)
8.	Object detection with sliding windows	Week 12+13	
	Deep Learning		Chapter(15)
9.	Neural networks basics and Convolutional networks	Week 14 + 15	