

City University of Hong Kong

**Information on a Course
offered by Department of Computer Science
with effect from Semester A in 2012 / 2013**

Part I

Course Title: Image Computing

Course Code: CS6183

Course Duration: One Semester

Credit Units: 3

Level: P6

Medium of Instruction: English

Prerequisites: Nil

Precursors: Nil

Equivalent Courses: Nil

Equivalent to the Old Course Code & Title: IT6901 Image Computing

Exclusive Courses: Nil

Part II

Course Aims

This course aims to provide conceptual and theoretical foundations on some key issues in image processing and 3D computer graphics which are two of the enabling technologies for multimedia, CAD, and computer vision systems.

Course Intended Learning Outcomes (CILOs)

Upon successful completion of this course, students should be able to:

No.	CILOs	Weighting (if applicable)
1.	identify the main characteristics of different image processing and computer graphics techniques through observation of their operations;	

2.	implement selected image processing and computer graphics algorithms;	
3.	perform a critical assessment of different image computing approaches in terms of their merits and shortcomings;	
4.	create a new application in the areas of multimedia, CAD and computer vision by applying suitable image computing approaches.	

Teaching and Learning Activities (TLAs)

(Indicative of likely activities and tasks designed to facilitate students' achievement of the CILOs. Final details will be provided to students in their first week of attendance in this course)

Teaching pattern:

Suggested lecture/tutorial/laboratory mix: 2 hrs. lecture; 1 hr. tutorial.

CILO No.	TLAs	Hours/week (if applicable)
CILO 1,3,4	Lecture: The lecture will focus on the introduction of image processing and computer graphics techniques, and their relations to the areas of multimedia, CAD and computer vision.	
CILO 1,3	Tutorial: Students will complete a different problem set each week, and to present their solutions in the class. They will discover the main characteristics of different image processing and computer graphics techniques through these problems, and perform critical assessment of these techniques.	
CILO 2,4	Project: The students will apply and combine suitable image computing approaches to create a new application in the areas of multimedia, CAD or computer vision.	

Assessment Tasks/Activities

(Indicative of likely activities and tasks designed to assess how well the students achieve the CILOs. Final details will be provided to students in their first week of attendance in this course)

CILO No.	Type of Assessment Tasks/Activities	Weighting (if applicable)	Remarks
CILO 1	Coursework: The ability of students to identify the main characteristics of different image processing and computer graphics techniques through the tutorial problems will be used to assess this ILO. Examination: Final examination will include questions to assess the capability of		

	students to identify the main features of different image computing approaches.		
CILO 2	Coursework: In the project, students are required to implement different image computing algorithms. The effectiveness of the implemented algorithms will be used to assess this ILO.		
CILO 3	Coursework: In the tutorial exercises, students will perform a critical assessment of different image computing approaches in terms of their effectiveness and efficiency. The quality of their evaluation will be used to assess this ILO. Examination: Final examination will include questions to assess the capability of students to critically compare different image computing approaches.		
CILO 4	Coursework: In their projects, students will create a new application in the areas of multimedia, CAD or computer vision. Their capability to apply and combine suitable image computing approaches to the creation of the application will be used to assess this ILO. Examination: Final examination will include questions to assess the capability of students to judiciously apply and combine suitable image computing approaches to solve a real-world problem.		

Grading of Student Achievement: Refer to Grading of Courses in the Academic Regulations for Taught Postgraduate Degrees.

Examination duration: 2 hours

Percentage of coursework, examination, etc.: 30% CW; 70% Exam

Grading pattern: Standard (A+AA-...F)

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Part III

Keyword Syllabus

Image transform and Sampling theory. Image segmentation - edge detection. Line detection. Thresholding: Region growing. 3D Computer graphics.

Syllabus

- Image Processing
Sampling theory, image transform, image enhancement, image segmentation and analysis.
- Computer Graphics
3D transformations, projection, clipping, object modeling, rendering.
- Applications of Image Computing
Applications of image computing approaches in different areas such as multimedia, CAD and computer vision.

Recommended Reading

Text(s)

R.C. Gonzalez and R.E. Woods, “Digital Image Processing”, Third Edition, Prentice Hall, 2008

F.S. Hill and S.M. Kelley, “Computer Graphics Using OpenGL,” Third Edition, Pearson Education, 2007

Online Resources