Course Syllabus

1. **Program of Study** Bachelor of Science (Computer Science)
   Faculty/Institute/College Mahidol University International College
   Mahidol University

   Course Code ICCS 332 **Course Title** Image Processing and Visualization

2. **Number of Credits** **4 (Lectures/lab)** (3 - 2)

3. **Prerequisite(s)** ICCS 321

4. **Type of Course** Elective

5. **Trimester / Academic Year** Trimester II / Year 2005 - 2006

6. **Course Description**
   A range of state-of-the-art techniques: imaging techniques: spatial-frequency representations, image alteration, filtering techniques, pattern analysis in images; practical assignments on various image processing techniques, visualization techniques: the generation of realistic models, such as fractal models of landscapes.

7. **Course Objective(s)**
   By the end of the course students should:
   - Develop an overview of the field,
   - Gain understanding about fundamental image-processing algorithms,
   - Be able to apply image-processing techniques to solve real problems,
   - Be prepared for continuing education in the field of image processing.

8. **Course Outline**

Week	Topic				Instructor
	Lecture	Hour	Lab	Hour	
1	Introduction to Image Processing, Digital image fundamentals	3	Background on MATLAB & Image Processing Toolbox	2	Dr. Udom Silparcha
2	Image enhancement in the spatial domain	3	Linear & Nonlinear Spatial filtering	2	
3	Image enhancement in the frequency domain	3	2-D Discrete Fourier Transform	2	
4	Image restoration	3	Direct Inverse & Wiener Filtering	2	
5	Color image processing	3	Color image smoothing & sharpening	2	
6	Wavelets and multiresolution processing	3	Fast Wavelet Transform	2	
7	Image compression	3	JPEG Compression	2	

Week	Topic				Instructor
	Lecture	Hour	Lab	Hour	
8	Morphological image processing	3	Dilation and Erosion and their combination	2	Dr. Udom Silparcha
9	Image segmentation	3	Hough Transform	2	
10	Representation and description	3	Fourier Descriptors	2	
11	Object recognition	3	String Matching	2	
	Total	**33**		**22**	

9. Teaching Method(s)

Lectures, exercises, project, discussion, and self-study

10. Teaching Media

Text and teaching materials, Powerpoint, and handouts

11. Measurement and Evaluation of Student Achievement

Assessment made from stated criteria: students with 85% obtain grade A

12. Course Evaluation

1. Participation 5%
2. Assignments (×5) 25%
3. Project 20%
4. Mid-term exam 20%
5. Final exam 30%

13. Reference(s)

Gonzalez, R.C. and Woods, R.E., 2002. Digital Image Processing-2nd ed. Prentice Hall, Upper Saddle River, NJ.

Russ, J.C., The Image Processing Handbook-4th ed. CRC Press, Boca Raton, FL.

14. Instructor(s)

Dr. Udom Silparcha

15. Course Coordinator

Dr. Udom Silparcha