

The University of Texas at Tyler
Master of Science in Computer Science

Course Syllabus

Course Number:	COSC 5361
Course Title:	Digital Image Processing
Course Description:	This course introduces basic concepts in Digital Image Processing. Topics include: two dimensional transforms, filtering, enhancement, restoration, edge detection, segmentation, texture, matching, image representation, feature detection, and applications.
Pre-requisites:	COSC 2336, COSC 2315
Credits:	3 hours lecture
Text(s):	Kulkarni, A. D. (2001). <i>Computer vision and fuzzy neural systems</i> , Prentice Hall PTR, Upper Saddle River, NJ. Additional References: Gonzalez R. C., and Woods, R. E. (1992). <i>Digital Image Processing</i> . Addison Wesley, New York.
Languages Used: (if applicable)	Not Applicable
Topics:	<ol style="list-style-type: none"> 1. Introduction 2. Image acquisition and digitization 3. Enhancement techniques 4. Geometric Corrections and registration 5. Interpolation methods 6. Image compression 7. Segmentation 8. Feature extraction 9. Associative memory 10. Applications
Additional Materials:	

Evaluation Method: (only items in dark print apply)	
1. Examination/Quiz	2. Homework
3. Paper/Report	4. Computer Program
5. Project	6. Presentation
7. Class Participation	8. Peer Review
9.	10.

Course Objectives¹: By the end of this course students are expected to:
1. Describe various stages in the knowledge discovery in databases (KDD) process [1, 7]
2. Demonstrate with the help of histograms how contrast enhancement is achieved [1,3,7]
3. Explain with the help of equations interpolation techniques [1,3]
4. Develop a software tool to implement various enhancement techniques [1,3,4,5]
5. Explain various data compression methods [1,3]
6. Design a software tool for image compression and decompression algorithms [1,3,4,5]
7. Compare various techniques for extracting texture features [1,7]
8. Discuss three applications of enhancement and feature extraction techniques. [1,7]
9. Develop a software tool to implement two well know algorithms for edge detection [1, 2, 45]
¹ Numbers in bracket refer to method(s) used to evaluate the course objective.

Relationship to Program Outcomes: (only items in dark print apply)²
This course supports the following computer science graduate program outcomes, which state that our students at the time of graduation are expected to:
1. possess an enhanced breadth of knowledge in computer science, combined with a depth of knowledge in critical core areas of computing [1,2,5,7];
2. possess the skills and knowledge for lifelong learning in computer science;
3. possess knowledge of the theoretical foundations of computing and have strong practical application experience [4, 6, 8, 9];
4. posses and demonstrate oral and written communication skills;
5. understand and respect the professional standards of ethics expected of a computer scientist and be knowledgeable concerning the history of computing field;
6. possess a knowledge of computer security and computer security management;
7. analyze and compare relative merits of alternative software design, algorithmic approaches, and computer system organization, with respect to a variety of criteria relevant to the task (e. g. efficiency, scalability, security) [5, 6, 9]; and
8. implement algorithms in multiple programming languages, on multiple hardware platforms, and multiple operating system environments.
² Numbers in brackets refer to course objective(s) that address the Program Outcome.

Prepared By: Arun Kulkarni	Date: October 31, 2007
Reviewed By:	Date: