

COURSE DESCRIPTION

Dept., Number	CSci 582	Course Title	Special Topics in Computer Science II: Image Processing
Semester hours	3	Course Coordinator	Yixin Chen, Assistant Professor

Current Catalog Description

Special topics in computer science.

Topic description: The fundamentals of processing digital images including the acquisition of images from sensors, image transformations, enhancement, compression, restoration, and segmentation.

Textbook

M. Seul, L. O’Gorman, and M. J. Sammon, *Practical Algorithms for Image Analysis*, Cambridge University Press, 2005.

References

Class website: <http://www.cs.olemiss.edu/~ychen/courses/CSCI582S07/>

Course Outcomes

Upon successful completion of the course, the students:

1. understand the algorithmic aspects of image acquisition, image transformation, image enhancement, image restoration, and image segmentation,
2. are able to write computer programs to implement the techniques discussed in the class,
3. can identify and apply an image processing method for an application of interest.

Relationship between Course Outcomes and Program Outcomes

This is a course taken primarily by beginning computer science graduate students. It is sometimes taken by undergraduate students as an elective to enrich their programs.

The course outcomes contribute to the program outcomes as follows: (1) to (a), (2) to (b), and (3) to (c).

Prerequisites by Topic

The official prerequisites for CSci 581 and 582 are CSci 211 (Computer Science III) and CSci 223 (Computer Organization and Assembly Language). However, the students in this section should also have completed introductory differential and integral calculus (Math 262) and discrete mathematics (Math 301).

Major Topics Covered in the Course

1. Introduction to digital image processing. (1 hour)
2. Image enhancement. (3 hours)
3. Geometric image transformation. (2 hours)
4. Fourier transformation. (5 hours)
5. Noise reduction. (4 hours)
6. Edge detection. (4 hours)
7. Interest point detection. (4 hours)
8. Image compression. (4 hours)
9. Morphological transformation. (6 hours)
10. Applications. (3 hours)
11. Exams. (3 hours)

Assessment Plan for the Course

This is an elective course offered approximately every two years primarily to computer science graduate students. An offering typically has 3 examinations and 8 programming and homework assignments. Outcome 1 is assessed by the exams and homework assignments, outcome 2 by two programming assignments, and outcome 3 by two programming assignments.

How Data in the Course are Used to Assess Program Outcomes (unless adequately covered already in the assessment discussion under Criterion 4)

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Estimate Curriculum Category Content (Semester hours)

Area	Core	Advanced	Area	Core	Advanced
Algorithms		2	Software design		
Data structures		1	Concepts of programming languages		