Metropolitan State University of Denver
Omnibus Course Syllabus

CS 390S   Digital Image Processing   Spring 2018

Status	completed
Approval Process Name	01. UG New Omnibus Course (17-18)
Originator	Feng Jiang
Created	09/11/2017 11:36PM
Launched	09/11/2017 11:51PM
Department	Department of Mathematical and Computer Sciences
Prefix:	CS
Course Number:	390S
Course Type:	Computer Science
Course Title (include Semester and date for course to run):	Digital Image Processing (Spring 2018)
Transcript Course Title:	Digital Image Processing
Is this a study abroad course?	No
Equivalent/ Crosslisted?	
List all equivalent courses:	
List all crosslisted courses:	
Credit Hours:	4
Distribution of Credit Hours	4 (4+0)
Schedule Type:	Lecture
Grade Mode:	Letter
Lecture:	60
Lab:	
Internship:	
Practicum:	
Other:	
Additional Student Work Hours per course:	120
Specified repeatable course:	No
If yes, number of credits/ repeats allowed	
Prerequisite(s):	CS2050 with grade of "C" or better CS1400 with grade of "C" or better Or permission of instructor
Corequisite(s):	
Prerequisite(s) and/or Corequisite(s):	
Banner Enforced Prerequisite(s):	CS2050 and CS1400
Minimum passing grade for Banner enforced prerequisite course(s):	C
Banner Enforced Corequisite(s):	
Minimum passing grade for Banner enforced corequisite course(s):	

CS 390S

Banner Enforced Prerequisite(s) and/or Corequisite(s):	
Minimum Passing Grade for Banner Enforced Pre/Corequsites	
Level	
Class	
Program	
Student attribute	
Major	
Other Registration Restriction(s):	
Course Description:	This course presents fundamental concepts and techniques in digital image processing. Both theoretical material and computing techniques are introduced. The analytical tools and methods which are currently used in digital image processing are introduced and applied to practical applications. Basic digital computing knowledge and programming skills are reinforced by solving real world problems.
Required Reading and Other Materials will be equivalent to:	1. Gonzalez, R. C., & Woods, R. E. Digital image processing 3rd ed c2008. Printice-Hall, Inc. 2. Jain, Anil K. Fundamentals of digital image processing. 1989. Prentice-Hall, Inc. 3. Pratt, W. K. Digital Image Processing. 1991. Publisher John Wiley & Sons.
Specific, Measurable Student Behavioral Learning Objectives:	Upon completion of this course the student should be able to: 1. Describe the processes of image acquisition, sampling and quantization. 2. Recognize the terminologies of digital image processing. 3. Construct the processes of image filtering, image transformation, image enhancement and image restoration. 4. Evaluate the effect of the human visual system on image perception. 5. Select appropriate image processing techniques to solve real problems. 6. Demonstrate the application of image processing algorithms.

Detailed Outline of Course Content (Major Topics and Subtopics) or Outline of Field Experience/ Internship	1. Fundamentals of digital image processing
	
	  a. Digital image formats
	
	  b. Color models
	
	  c. Image sampling and quantization
	
	2. Fundamentals of two-dimensional image signal
	
	  a. Basic pixel relationships
	
	  b. Geometric transformations
	
	  c. Thresholding and histogram processing
	
	3. Image enhancement
	
	  a. Basic image filtering, edge detection and noise reduction
	
	  b. Image enhancement in the spatial domain

	c. Image enhancement in the frequency domain
	4. Image restoration
	a. Image restoration process
	b. Estimation of degradation
	c. Image restoration methods
	5. Morphological processes
	a. Basic morphological methods
	b. Applications of morphological methods
	6. Image analysis and object recognition
	a. Image description
	b. Segmentation and object recognition
	7. Human visual system
	a. Image perception and human visual system models
	b. Applications of human visual system models
	8. Advanced applications of digital image processing
	a. Applications in biometrics
	b. Pattern recognition and transportation safety
	c. Image security
Evaluation of Student Performance	A combination of at least 3 of the following: 1. In-class assignments 2. Homework assignments 3. Project report(s) 4. Presentation(s) 5. Examinations
Learning Objectives	

Steps	Decision
Originator	
Feng Jiang	Approve 09/13/2017 04:53PM
Department Curriculum Committee Chair	
Clark Dollard	Reject 09/14/2017 02:57PM
Originator	
Feng Jiang	Approve 09/14/2017 11:28PM

CS 390S

Department Curriculum Committee Chair	
Clark Dollard	Approve 09/15/2017 12:06PM
Department Chair	
Lindsay Packer	Approve 09/15/2017 12:41PM
Associate Dean	
Linda Lang-Peralta	Approve 09/28/2017 12:27PM
Registrar's Office	
Jeremy Coleman	Approve 09/29/2017 08:52AM