ROCHESTER INSTITUTE OF TECHNOLOGY
COURSE OUTLINE FORM

COLLEGE OF SCIENCE

Chester F. Carlson Center for Imaging Science

NEW COURSE: COS-IMGS-756 – Advanced Digital Image Processing

1.0 Course Approvals

Required course approvals:	**Approval request date:**	**Approval granted date:**
Academic Unit Curriculum Committee	7/30/2010	9/15/2010
College Curriculum Committee	9/28/2011	11/8/2011

Optional designations:	**Is designation desired?**		***Approval request date:**	****Approval granted date:**
General Education:		No		
Writing Intensive:		No		
Honors		No		

2.0 Course information:

Course title:	Advanced Digital Image Processing
Credit hours:	3
Prerequisite(s):	IMGS-682 or permission of instructor
Co-requisite(s):	None
Course proposed by:	Harvey Rhody
Effective date:	Fall 2013

	Contact hours	**Maximum students/section**
Classroom	3	20
Lab		
Studio		
Other (specify)		

2.1 Course Conversion Designation (Please check which applies to this course)

X	Semester Equivalent (SE) Please indicate which quarter course it is equivalent to: 1051-786 Advanced Digital Image Processing
	Semester Replacement (SR) Please indicate the quarter course(s) this course is replacing:
	New

2.2 Semester(s) offered (check)

Fall X	Spring	Summer	Other

All courses must be offered at least once every 2 years. If course will be offered on a bi-annual basis, please indicate here: X

2.3 Student Requirements

Students required to take this course:
Students who might elect to take the course: Students on image processing track in M.S. and Ph.D. program, and other graduate students in the College of Science or College of Engineering

3.0 Goals of the course (including rationale for the course, when appropriate):

3.1 To develop a knowledge base and comprehensive set of related skills in image processing.
3.2 To put together a diverse collection of techniques to create a working application system.
3.3 To develop project management skills through a structured design and reporting process.

4.0 Course description

IMGS-756 Advanced Digital Image Processing

This course investigates algorithms and techniques for a variety of imaging applications. The techniques build on the background from IMGS-682. The course is taught using a lecture and group project format, in which the lectures focus on advanced techniques and provide applications of their use in selected applications. The group projects enable students to work on substantial designs that require the understanding of the task domain, exploration of solution methods by analysis and prototyping, and implementation of a selected approach. Each team presents a preliminary plan, an approach with feasibility analysis, and a final demonstration. (IMGS-682 or permission of instructor). **Class 3, Credit 3 (F, alternate years)**

5.0 Possible resources (texts, references, computer packages, etc.)

Journal and conference publications related to project choices.

6.0 Topics (outline):

6.1 Topics will vary by project: Teams of 2 to 4 students collaborate on term-long projects and provide three presentations on their project, with the final presentation generally being a demonstration of the chosen application. Example projects are listed below.

6.1.1 Stitching of two or more images
6.1.2 Image-based rendering
6.1.3 Constructing stereo images
6.1.4 Combining images and geographic information
6.1.5 Measuring object dimensions from images
6.1.6 Estimating motion (optical flow)
6.1.7 Object tracking
6.1.8 Determining your location (or path) from multiple images
6.1.9 High Dynamic Range (HDR) imaging
6.1.10 Multiple projector display

7.0 Intended course learning outcomes and associated assessment methods of those outcomes

Course Learning Outcome	Project presentations	Project reports
7.1 Demonstrate an application area and identify appropriate technical elements.	X	X
7.2 Review and apply scientific and technical literature findings to the project	X	
7.3 Design and implement instruments and computing tools	X	X
7.4 Analyze whether a system meets requirements	X	X
7.5 Perform technical writing and presentation	X	X

8.0 Program outcomes and/or goals supported by this course

8.1 Ability to integrate knowledge within a system context.
8.2 Development of research skills.
8.3 Ability to apply computational tools in implementation and testing phases.

9.0 N/A

10.0 Other relevant information (such as special classroom, studio, or lab needs, special scheduling, media requirements, etc.)

Smart classroom