

**Rochester Institute of Technology**  
Rochester, New York

College of Imaging Arts and Sciences  
School of Film and Animation

NEW COURSE:

**1.0 Title: Digital Color Management Date: 5-11-2009**

**Credit Hours: 4**

**Prerequisite(s):** 1051-402 (Color Science)

**Corequisite(s):** None

**Course proposed by:** Edward J. Giorgianni

**2.0 Course Information:**

	Contact Hours	Maximum students/section
Classroom	4	15
Lab	none	
Studio	none	
Other (specify)	none	

**Quarter(s) offered (check)**

\_\_\_\_\_ Fall     Winter    \_\_\_\_\_ Spring    \_\_\_\_\_ Summer

**Students who might elect to take the course:**

Digital Cinema students (JPHF)

Imaging Science students (SIMG)

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

The principal goal of this course is to provide students with a practical understanding of colorimetry and densitometry as applied to color imaging applications, the basic colorimetric properties of color imaging media/devices and systems, digital color encoding principles and methodologies, color management concepts and paradigms, and practical color-management system implementations. The rationale for the course is that a solid understanding of these topics will be expected of Digital Cinema and Imaging Science graduates who intend to find positions and pursue careers in the color-imaging industry.

**4.0 Course description (as it will appear in the RIT Catalog, including pre- and co-requisites, quarters offered):**

**2065-XXX**

**Digital Color Management**

This course offers a comprehensive study of the methods and techniques used to manage and interchange color in modern digital color-imaging systems. The principles of colorimetry and densitometry will be reviewed and applied specifically to color imaging applications. The fundamental colorimetric properties of color imaging media, devices and systems will be explored and compared. Digital color encoding principles will be examined, and the features and limitations of various digital color encoding methods will be described. The three basic paradigms underlying all color managed systems will be discussed, and a new unified paradigm that encompasses all three basic paradigms will be introduced. The color encoding requirements and associated colorimetric transformations required to support that paradigm will be discussed. Various simple and complex systems based on the unified paradigm, including a Digital Cinema system currently being developed by AMPAS and SMPTE, will be described. Prerequisite: 1051-402 (Color Science)

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

5.1 Giorgianni and Madden, Digital Color Management: Encoding Solutions, Second Edition, ISBN 978-0470512449

5.2 Course Notes, Will be provided as PDF files

## **6.0 Topics (outline):**

### 6.1 Color Imaging Fundamentals

- 6.1.1 Measuring Color
- 6.1.2 Color-Imaging Systems
- 6.1.3 The Human Color-Imaging System

### 6.2 The Nature of Color Images

- 6.2.1 Electronic Displays
- 6.2.2 Electronic Imaging Systems
- 6.2.3 Reflection Images
- 6.2.4 Projected Images
- 6.2.5 Photographic Negatives

### 6.3 Digital Color Encoding

- 6.3.1 Encoding Concepts
- 6.3.2 Densitometric Color Encoding
- 6.3.3 Colorimetric Color Encoding
- 6.3.4 Scene-Based Color Encoding
- 6.3.5 Color-Encoding Data Metrics
- 6.3.6 Output Signal Processing
- 6.3.7 Myths and Misconceptions

### 6.4 Digital Color Management

- 6.4.1 Color Management Paradigms
- 6.4.2 Basic Properties for a Unified Paradigm
- 6.4.3 Color Encoding Requirements
- 6.4.4 Color Encoding Transformations
- 6.4.5 Example Color-Managed Systems
- 6.4.6 Color Management for Digital Cinema
- 6.4.7 Digital Color Interchange
- 6.4.8 Color Management Implementations

**7.0 Intended Learning outcomes and associated assessment methods of those outcomes:**

**Learning Outcome**

Learning outcome	Assessment Method		
	Homework Assignments	Individual/Team Projects	Quizzes/Exams
7.1 Demonstrate knowledge of colorimetry and densitometry, as they apply to color imaging applications	X	X	
7.2 Demonstrate knowledge and understanding of the basic colorimetric properties of color imaging media, devices and systems	X	X	
7.3 Demonstrate comprehension of digital color encoding principles	X	X	
7.4 Demonstrate ability to differentiate and contrast various methods of encoding color in digital form	X	X	
7.5 Demonstrate ability to differentiate and contrast various paradigms for managing color on digital imaging systems	X	X	
7.6 Demonstrate ability to understand the color management of imaging systems of various types and degrees of complexity	X	X	

**8.0 Program or general education goals supported by this course:**

This course will help Digital Cinema and Imaging Science students transition from theory to practical application as they progress towards the completion of their degrees. Students will receive first-hand descriptions of product development experiences and will participate in discussions of color-management developments currently taking place. The course will provide students with knowledge that will be important when they pursue careers in the field of color imaging.

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

**Required:** A classroom with digital projector and basic lecture facilities

**10.0 Supplemental Information: None**