

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

COLLEGE of SCIENCE
Chester F. Carlson Center for Imaging Science

Applied Colorimetry 1050-702, 1051-775, 1051-775.90

- 1.0 **Title:** Applied Colorimetry **Date:** May 6, 2004
Credit Hours: 4
Prerequisite(s): Graduate status Center for Imaging Science
Course proposed by: Roy S. Berns

2.0 **Course information:**

	Contact hours	Maximum students/section
Classroom	4	20
Lab		
Studio		
Other (specify _____)		

Quarter(s) offered (check)

Fall Winter Spring Summer

Students required to take this course:

Color Science MS, PhD
Imaging Science MS, PhD, color-imaging track

Students who might elect to take the course:

Graduate students in printing

3.0 **Goals of the course:**

To provide a fundamental understanding of color science, emphasizing colorimetry, color order systems, the use of linear algebra in color science, historical development of color-tolerance equations, and basic color signal processing in color management.

4.0 **Course description**

1050-702

Applied Colorimetry

This course covers the principles of color science including theory and application. Topics include CIE colorimetry, the use of linear algebra for color transformations, the Munsell color order system, metamerism, color inconstancy, history and theory of color tolerance equations and spaces, and an overview of color management. **Class 4, Credit 4 (W)**

5.0 Possible resources

5.1 Berns, R.S., *Billmeyer and Saltzman's Principles of Color Technology, 3rd Ed.*; Wiley-Interscience: New York, (2000).

5.2 Assigned journal and proceedings papers.

6.0 Topics (outline):

6.1 Derivation of CIE standard observers.

6.2 Derivation of tristimulus values and chromaticities.

6.3 Variability in color-matching functions.

6.4 Tristimulus integration and numerical approximations.

6.5 Use of linear algebra in colorimetry.

6.6 Transformation of primaries.

6.7 Derivation of the Munsell color order system.

6.8 Historical development of CIELAB.

6.9 Derivation of color-tolerance equations.]

6.10 Indices of metamerism.

6.11 Chromatic adaptation transforms and color inconstancy indices.

6.12 Overview of color management and color image encoding.

7.0 Intended learning outcomes and associated assessment methods of those outcomes

Learning outcome	Exams and quizzes	Homework/Project assignments
7.1 Tristimulus integration analysis	X	X
7.2 Linear transformations in color-matching function visual experiments	X	X
7.3 Generating cross-media metamers	X	X
7.4 Deriving color-tolerance equations from psychophysical data	X	X
7.5 Metameric indices using parameric decomposition	X	X
7.6 Indices of color inconstancy and chromatic adaptation transforms	X	X
7.7 Filter optimization for colorimetric cameras	X	X

8.0 Program or general education goals supported by this course

8.1 Enable students to obtain an understanding of the basic concepts of color science. (COS/Color Science)

8.2 Develop the ability to use linear algebra for color processing (COS/Color Science)

8.3 Understand the historical context of common color calculations(COS/Color Science)

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

9.1 Occasional access to RIT Munsell Color Science Laboratory instrumentation and facilities required for demonstrations.

10.0 Supplemental information - NONE