

SIMG-749 COLOR REPRODUCTION

I. Course:

SIMG-749 COLOR REPRODUCTION

1.1 Four (4) Credit Hours

1.2 Four (4) Lecture Hours per Week

1.3 Prerequisites: SIMG 711 *Basic Princ. Im. Sci. I*
OR Permission of Instructor

1.4 Corequisites: SIMG 712 *Basic Princ. Im. Sci. II*
OR Permission of Instructor

II. Course Catalog Description:

This course presents the concepts required for an understanding of the relationships between mean-level input and output in various color imaging systems. Analog, digital, and hybrid color imaging systems will be covered. Special emphasis will be given to mean-level reproduction in photography, printing, and television.

III. Course Objective:

3.1 Understanding of the fundamental principles of mean-level input/output relationships

3.2 Analysis of a few specific imaging systems

3.3 Ability to measure and analyze tone and color reproduction properties

IV. Course Outline:

4.1 Introduction to Images and Imaging
A. Imaging Technologies and Systems
B. Images That We See
C. Elements of Imaging
D. Evaluation of Imaging

4.2 Fundamental Statistical Limitations
A. Ideal Arrays of Photon Counters
B. Image Density Characteristics
C. Random Array of Receptors
D. Image Resolution
E. Detective Quantum Efficiency

4.3 Image Reproduction Fundamentals
A. Spectral Color Reproduction
B. Trichromatic Color Reproduction
C. The Additive Principle

- D. Additive Methods
- E. The Subtractive Principle
- 4.4 Tone Reproduction
 - A. Fundamentals
 - B. Photographic
 - C. Electrophotographic
- 4.5 Evaluation of Imaging Systems
 - A. Colorimetry of Additive Systems
 - B. Colorimetry of Subtractive Systems
 - C. Light Sources
 - D. Objectives in Color Reproduction
- 4.6 Color Photography
 - A. Subtractive Methods
 - B. Reflection Prints
 - C. Quantitative Methods
 - D. Masking and Colored Couplers
 - E. Printing Color Negatives
 - F. Chemistry of Color Photography
 - G. Image Structure
- 4.7 Color Television
 - A. Transmission of Signals
 - B. Electronic Cameras
 - C. Display Devices
 - D. NTSC and Similar Systems
 - E. The Use of Film in TV
 - F. Video Cassettes
 - G. HDTV Proposals
- 4.8 Digital Imaging
 - A. Scanning
 - B. Sampling, Quantization, and Storage (Disk)
 - C. Storage (VRAM) and Display
 - D. Output
 - E. Computer Graphics, Synthesis, and Animation
- 4.7 Color Printing
 - A. Photomechanical Principles
 - B. Preparation and Proofing
 - C. Masking
 - D. Color Scanners

V. **Instructional Techniques:**

- 5.1 Lectures

5.2 Demonstrations

VI. Evaluation:

6.1 Homework Assignments

6.2 Programming Assignments

6.3 Term Paper

6.4 Written Examinations

VII. Bibliography:

7.1 Required Text

A. R.W.G. Hunt, **The Reproduction of Colour, 5th Ed.**, Fountain Press, England, 1995.

7.2 Supplemental Reading

A. J. Sturge, V. Walworth, and A. Shepp, Eds., **Imaging Processes and Materials, Neblette's 8th Edition**, Van Nostrand Reinhold, New York, 1989.

B. J.C. Dainty and R. Shaw, **Image Science**, Academic, London, 1974.

C. T.H. James, Ed., **The Theory of the Photographic Process, 4th Ed.**, Macmillan, New York, 1977.

D. R.C. Gonzalez, **Digital Image Processing, 2nd Ed.**, Addison-Wesley, Reading, Mass., 1987.

E. L. Stroebe, J. Compton, I. Current, and R. Zakia, Eds., **Photographic Materials and Processes**, Focal Press, Boston, 1986.

F. *NEW IS&T HANDBOOK WHEN PUBLISHED*