

ROCHESTER INSTITUTE OF TECHNOLOGY
Center for Imaging Science / Munsell Color Science Laboratory

SIMG 402 Color Science
Tuesdays & Thursdays, 10:00AM-11:50AM, 18-1080

Homework Assignments:

All assignments are due at the beginning of class on the due date. Late assignments will be penalized one letter-grade per day late.

- (1) *Due 9/16/04:* Do some research to learn about the GretagMacbeth ColorChecker Chart (previously called simply "Macbeth ColorChecker") and construct something similar of your own to be used as a test target to evaluate color reproduction of an imaging system. Hand in a one-paragraph description of your target and bring it to class on 9/18/03.
- (2) *Due 9/23/04:* Find an imaging system (or combination of systems) to reproduce a printed image of your test target and make a few prints of it. Hand in a one-paragraph description of your imaging system and a copy of the print.
- (3) *Due 9/30/04:* Visually evaluate the quality of color reproduction of each step in your imaging system. Record your observations on the accuracy of hue, lightness, and chroma reproduction for the various samples in your target. Hand in a few paragraphs (perhaps with a table or two) describing your observations. If your system has intermediate steps (like a computer display), you should visually evaluate the color at that stage as well.
- (4) *Due 10/7/04:* Measure the spectral reflectance (45/0) of each sample on your test target and the corresponding locations on one (or more) of your prints. Record the spectral data to a file for later processing. Hand in a table of reflectance values for one sample from the target and its printed reproduction along with a plot of those spectra.
- (5) *Due 10/14/04:* Write a program (in any language or environment, but not in a spreadsheet!) to compute CIE XYZ tristimulus values and CIELAB coordinates from your measured spectra. You should have some way to select the standard observer and illuminant used in the computations. Hand in your commented source code, a brief description of what it does, and example computations for a few samples.
- (6) *Due 10/21/04:* Write a program (in any language or environment, but not in a spreadsheet!) to compute color difference values (ΔE_{ab}^* , ΔL^* , ΔC_{ab}^* , Δh_{ab} at least) CIE XYZ tristimulus values and CIELAB coordinates from your measured spectra. You should have some way to select the standard observer and illuminant used in the computations. Hand in your commented source code, a brief description of what it does, and example computations for a few sample pairs.

- (7) **Due 10/28/04:** Make plots of L^* vs C^* and b^* vs. a^* comparing your original test target with its printed reproduction. (Little arrows connecting the coordinates of the original to the coordinates of the reproduction are most useful.) Feel free to make other plots if you find them helpful. Hand in the plots with a description of what you can observe about your reproduction system from them.
- (8) **Due 11/4/04:** Write a few paragraphs describing the results of your color reproduction experiment and colorimetric analysis of it. Compare your visual observations with the computed color difference parameters and the plots generated in Homework (7).
- (10) **PRESENTATION, Due 11/9/04:** Prepare and present a 10-minute oral presentation on your quarter-long homework project to share your results with the rest of the class. Focus on the unique aspects of your project (e.g., target construction, imaging, reproduction quality). While some presentations will be given on 11/11/04, everyone should be prepared to be called upon on 11/9/04.
- (11) **TERM PAPER, Due 11/13/03:** Write a technical report on your quarter-long homework project. It should be modeled after a paper from a journal such as the *Journal of Imaging Science and Technology* or *Color Research and Application* and be of similar length (10-15 typed pages, 1.5 space, plus figures and tables). It should have the typical sections such as: Title, Abstract, Introduction/Background, Experimental, Results & Discussion, Conclusions, Acknowledgements, References, Appendices.