



The visible spectrum

GRC 101

INTRODUCTION TO GRAPHIC COMMUNICATIONS

POINTS OF CONCENTRATION

Information
Sheet No.

103

Important Emphasis Areas in GRC 101

Your success in GRC 101 relies heavily on your utilization of Information Sheets provided on the website and classroom demonstrations, projects and lecture notes.

This document outlines, in broad general terms, what we will be doing.

It is not organized in a linear manner so topics may be presented out of order from the way presented here.

Graphic communications is a dynamic, rapidly evolving industry. The many different forms of production and printing technology used in the industry call for people with many different skills and abilities. Graphic designers, including production and printing personnel and sales and marketing associates are among the people who make up the industry.

The printing industry has seen major changes in technology over the past several decades, introducing computerized applications as electronic prepress, graphics software for desktop publishing and computer-to-plate processes. For this reason, this course was designed to cover traditional forms of graphic reproduction with a focus on newer technologies that are steadily replacing older processes.

A detailed introduction to basic materials and processes classifications, electronic imaging technologies, color theories, papers, inks, and a host of related topics will be presented. Direct comparisons will be made between traditional and emerging technologies, the rationale for the changes and a glimpse of what the future is offering.

The term graphic communications refers to the exchange of information in visual form such as words, drawings and photographs. Printed materials are a primary medium of communication and can be found throughout society. Well designed newsletters, posters, food cartons, brochures and other publications are all intended to make a strong visual impression and are just some of the products created in the graphic communications industry.

All of these traditional venues are now being impacted by the rapid deployment of data to the World Wide Web. Web pages are now a part of the graphic communicators tool box. Nearly 85% of all web pages currently posted worldwide originated as printed matter or files originally designed for print output.

In GRC 101, persons who are not fully computer familiar will be given an opportunity to develop some rudimentary skills in their use. This is not entirely a computer course but, increasingly,

computers are playing major roles in how materials, both text and graphic, are originated, manipulated and ultimately utilized. A basic knowledge of computing equipment and use is mandatory for any person who desires to become successful in any area of graphic communications.

The flow of ideas in visual form is the and other A/V materials supplement them.

Important Points About Safety and Health

As you may have noted in the previous commentary, there are certain local safety and health regulations which will be in effect during all sessions of class. These regulations, available as part of Information Sheet 102 on the website, contain a form which must be signed and returned before participation in class activities is permitted.

Apart from the local rules and regulations regarding safety in the classroom and the general college environment, there are important and obvious rules which apply in the lab work process.

Please read the information sheet (102) on safety. Invariably someone comments about how obvious some of the precautions appear. Oblivion to the obvious can kill you. Read it anyway. There will be a quiz.

Pay particular attention to the terminology and any review questions. Become familiar with Material Safety Data Sheets (MSDS). They are a form with which you should remain familiar throughout your life. They can prevent injury and provide remedies to accidental exposures to all types of chemicals in your home and industrial environment.

These are not industry specific, but product specific and are required by

basic function of graphic communications. As communication systems continue to develop and advancements are made, the industry will evolve and serve an ever greater role in our technological society.

This course relies on the Information Sheets provided on the website as the major source of written material. Additional video

Federal Law. They can be of significant benefit when working on the job or just experiences in every day living.

In a commercial environment, all safety regulations are not about machines or equipment. In fact, most relate to chemical compounds in the form of solvents, aerosols, etc.

While the chemicals and other materials used in this class are generally harmless, in the real world of production, you can be affected and not know it. These will tell you the safe limits of exposure, the safe frequencies of exposure, and many other important facts with which you should familiarize yourself when working with cleaners, solvents, waxes, developers, etc.

Measurement Systems

The ability to make accurate measurements is basic to all segments of graphic communications.

The class lectures, discussions and handouts introduces the standard forms of measurement used in the industry and covers the different measuring devices and methods used in graphic reproduction. Study this material carefully. In your career, it can save your job and save you money.

We lost a Mars Explorer Lander because the measurements used were unfamiliar with some of the technical people. While it is probable that no graphic project would cause the expensive losses associated with that project, it illustrates how important

accurate and meaningful measurements are. It also illustrates that even the most educated people often lack a basic understanding of measuring accurately and verifying that, once made, measurements are correct.

Because modern graphic communications cross the boundaries of both modern technology and traditional skills, an understanding of the divergent but basic systems used in each area will be valuable to your future success.

Measurement is central in our industry to control size, volume, weight, spacial relationships, cost and a host of other things. Use of the appropriate measuring system in each instance is very important.

Most computer operators fail to realize that their equipment will perform with more precision if they (at least temporarily) abandon the traditional inches scale in favor of traditional printing measurements.

Not all "measurements" are made within the confines of the scenarios used in some of these materials. Later we will discuss another important area for measurement: color.

Color is measured using a special temperature scale? On that scale Blue (which is customarily considered a "cold" color) is actually a higher temperature than red (a traditionally "Hot" color) See what I mean?

Color is central to good communication. If color temperature is incorrect when analysis is made of color accuracy, results could be downright ugly.

Read all of the materials and be familiar with the terminology. You need to know and understand the most prevalent ones. Although not strictly quantifiable itself, this statement also applies to studying. . .

Typography

The Information Sheets and lectures on typography serve as an introduction to types and type designs and the important role

they play in graphic communications. It covers the application of different styles of type and identifies the elements that make up different type faces. The selection of typefaces is a key factor in the design of a successful visual image. The printed appearance of type often determines the quality of the image and is intended to convey a specific message.

With your fellow students you might want to study and discuss:

- How typefaces are identified by distinctive designs.
- Basic terms commonly associated with typefaces.
- The history and development of type styles.
- Elements that make up different typefaces.
- Common classifications of type.
- Design variations with families of type.

There is an old saying that type is the true "art" in graphic arts. After all, there is about 8-9 times more type than illustrative matter in most publications.

It is type which really sets the tone of the communication. We will have significant lecture materials on this topic because of its importance. You may be surprised to learn that good typography is everchanging and that all type characters did not really start out as type letters or punctuation, but started out as abbreviations or something else! What is the newest punctuation which is gaining acceptance? And lots more . . .

Design and Layout

Type is most often purely subjective. It's beauty must lie in the eye of the beholder. No matter how good a design may be it will be praised and criticized based on the understanding (of lack thereof) of those who see it.

You probably already know this but never think about it. Letters are symbols which turn matter into spirit. The

designers of the first types shaped their type forms so that the letters combine sensibly into words – the sole elements of which the reader should be conscious.

When a type design is good it is not because each individual letter of the alphabet is perfect in form, but because there is a feeling of unbroken harmony and rhythm that runs through the whole design, each letter to every other and to all.

The true beauty of a typeface lies in the way it seems to extract light from the paper as organized design. As in the other arts, it consists of a balance of movement.

This typographic experience has two components; life and balance of rhythm. We will cover the fundamental elements of design and the general layout principles used by graphic designers and type designers in the production of visual images. In design, sound principles must be applied to produce a visual message that is both functional and pleasing to the eye.

In the graphic communications industry, the design process is often combined and performed with layout and production. In many cases, graphic designers are responsible for page layout as well as the creation of visual images.

Text Composition

We will cover the use of different composition methods in the generation of text, from traditional hand composition and photocomposition to modern laser imaging applications driven by computer software.

Composition techniques used in the graphic communications industry have changed dramatically over the past decades.

Computer technology has led to the development of electronic composition as the dominant form of producing text and images and has had a tremendous effect on the industry.

Text composition is where the true revolution in communications began. It

was a practical method of setting typographic symbols and glyphs or letters that is credited to Johann Gutenberg. His invention of the letterpress process caused a revolution in all of the arts; in education, in commerce, in politics and led directly to the direct observation method which is the basis for all of our modern scientific methods.

You will be expected to be familiar with the important terms outlined in the lectures and in this chapter.

Work any review quiz questions and discuss such topics as:

- Traditional hand composition techniques used in relief printing.
- Materials used in the production of relief type.
- Different types of image carriers.
- The development of linecasting machines to produce type.
- “Cold Type” techniques and systems.
- Different classifications and the development of photocomposition.
- Modern technology and equipment used in electronic composition.
- Basic computer system components.
- How electronic files are stored.
- Text and graphic preparation for electronic imaging.
- Proofreading symbols and techniques.

This information is of extreme importance to future plant owners, designers, production management personnel and others who desire positions of responsibility in graphics as it leads directly to how proper decisions must be made regarding a host of imaging technologies and reproduction methods, materials, classes and processes.

Layout & Composition

Page layout is not always what it may seem. It does not refer merely to a page in a newspaper, magazine or other printed material. It also covers all manner of design element placement for any form

of reproduction, from a simple business card to an advertising poster, a brochure, billboard, a web site or any of the other areas in graphic communications.

It is, generally, process independent. The final product might eventually be used for offset lithographic printing, screen printing, dye sublimation, wide format printing, ink jet reproduction, photographic and even holograms. It is always all of the mechanical and/or electronic steps which must be completed to make a design suitable for printing, web transmission, broadcasting or other reproduction, etc.

After studying this material, you should be able to explain the role of the paste-up artist, summarize the tools and equipment used in the paste-up process, describe the paste-up steps for production of a mechanical, explain the electronic page composition process used to combine text and graphic images and define and correctly use the terms unique to electronic page composition.

You will cover the traditional page layout techniques and electronic production methods used in page composition.

The process of preparing a mechanical, known as a paste-up, has gradually declined in the graphic communications industry. The application of computers has led to the widespread use of electronic methods of assembling text and illustration on a page.

In most graphic communications facilities today, computers and page composition software are used to combine text and graphics into page formats that can be output to a printer, an imagesetter or a digital press.

In addition to discussing the layout materials and tools that are required in traditional paste-up, the different software programs and techniques used in electronic page composition will be outlined.

Study and review the terms in the

information sheets and any given additional ones given in lecture. You will be doing little in the way of hands-on mechanical paste-up. You will, however, be using computers to create projects consisting of a combination both graphics and text.

During this process you will be familiarized with the normal terminologies and protocols associated with the most common page layout and photo-manipulation software. These experiences will provide an opportunity to gain new knowledge about applying the new technologies and/or expand your present understanding of this critical area in graphic communications.

Color Vision & Theory

When discussing the basic principles of light and color the different systems and models associated with color perception will be revealed.

Color plays a major role in defining our surroundings and determining how images are perceived. A basic understanding of color and the ways to describe relationships between different colors is fundamental in using color as an important design element.

Over the past decade, the application of computer technology has had a dramatic effect on color reproduction and has led to more efficient methods of multicolor printing in the graphic communications industry. You should carefully read and study this chapter as the information it contains will help you understand material presented during the lectures.

You might review and give special consideration to:

- The range of visible light wavelengths in the electromagnetic spectrum.
- How to measure the color temperature of light.

- How light behaves.
- The photomechanical reaction of the human eye to light images.
 - How the eye adjusts to light conditions.
 - Common situations involving color consistency.
 - Additive and subtractive color theories.
 - Variables that affect color perception.
 - Instruments used to measure color.

Check the effect of color perception with changing illumination. Take a page from the color comics page (for instance) and go into a darkened room. One with a single candle will do. Let your eyes adjust to the low illumination and then, from the furthest distance possible, view the image. See which parts of the image are not readily discernible. Check several times, each closer to the light source. Observe how the image changes. You might be really surprised, and understand how cats seem to “see in the dark”.

Electronic Prepress and Digital Printing

Prepress, similar to page layout, is not always strictly what the name implies. Much “prepress” work is required whether the final product is printed on a printing press, used in videography or a web site.

The prepress technologies used to assure creation of files that accurately reproduce and/or transmit, resize, combine with other art, etc., are all in the domain of the prepress area. Covering this material will guide you through some of the different electronic systems and software programs used in graphic design, page composition, image conversion and digital printing. Digital technology is used today in almost every production phase in the graphic communications industry.

Computer applications have become standard in the prepress stage and have revolutionized the entire imaging process

from the initial creation and formatting of text through the entire production process. The development of advanced electronic imaging systems has resulted in higher image quality and greater efficiency in graphic production. You should carefully read and study to better understand the significant impact which is affecting every graphic communications worker.

There will be discussion on the standard computer platforms used, the electronic creation of original and recycled text and graphics, vector and raster or bitmapped, page description languages used to identify and interpret electronic files, common file formats, file compression techniques, prepress proofing systems and much more.

Many people, new to this field, have a false conception that it is too complicated to learn all that must be known and be functional in the fast paced field because so much has happened, so quickly. That is not actually the case. The basics remain the same; the nuances change because of the rapidly changing technologies and new solutions to the problems. These systems can be comprehended with minimal effort by attending the lectures and utilizing the information sheets, taking good notes and then asking questions in class.

Digital Image Capture

Just what is a megapixel anyway? Do (or should) you really care? Is electronic zoom the same as optical zoom? How does a scanner scan? What is resolution? What is bit depth? These, and many others, cause pause in the graphics community. They are among the buzz words and geek phrases which are liberally scattered about the landscape. In class we will cover the principles of digital imaging technology and the different types of equipment and methods involved in electronic image capture.

Digital imaging techniques and devices are shaping the future of graphic reproduction. The use of digital imaging equipment such as scanners, digital cameras and camera backs has become widespread in the graphic communications industry and allows the production of high-resolution images through the creation and manipulation of electronic files.

Digital imaging systems have greatly shortened the time spent in the reproduction of images and commonly result in higher image quality and greater efficiencies in the production process.

It is imperative that the successful graphic communications professional understand and successfully utilize electronic image files. There are a lot of misconceptions about their creation, use and functionality both professionally and personally.

If you are not now taking digital pictures you soon will be. The phototrophic industry and its vendors are reinventing themselves and their companies as they take the ever-accelerating path toward digital imaging as the future of photography.

These processes are more environmentally friendly, require less labor to produce, can provide instant gratification to the photographer, require no new "film" each time the camera is loaded, and a host of other positive benefits to both business and home users. Since photography is the basis for much of the imaging process, you must understand digital imaging's advantages, disadvantages, uses and misuses, and be able to use this output system across a broad spectrum of reproduction equipment, computers, software, etc.

During this section of the class we will delve into these problems, seek solutions and provide guidelines you might want to follow in your own personal quest to become a part of the digital photographic age.

Color Management

There are a number of different color models and management systems used to identify color attributes and maintain consistency throughout color reproduction. A skilled graphic artist must recognize the attributes, strengths and weaknesses of these systems because they are designed to make conversions of image files when they are transferred from one electronic device to another.

During each phase of production, imaging systems use color management to modify digital data and preserve qualities of the original image. Because of the widespread use of electronic technology in the graphic communications industry, standardized systems have been developed to manage color in such tasks as scanning, color separation, proofing and printing.

Topics for discussion may include:

- Industry standards and regulations relating to color reproduction.
- Color specifications used in multicolor printing.
- Different systems and procedures used in color management.
- Processes and elements involved in calibration.
- Color limitations of display monitors and printing devices.
- Understanding different color formation methods.
- Scanner characterization and calibration techniques.
- Using image modes to convert, edit and display color images.
- Different color separation and color correction systems.
- Common trapping methods used in page composition programs.
- Screening options offered by digital imaging systems.
- Preflighting electronic color files.

- Proofing systems used in graphic reproduction.

You should read and study these materials, the terms and definitions and work any quiz and/or review questions.

Line Photography

Line photography is the basic process used in the photomechanical process of converting original images to film and will demonstrate the standard equipment and operational techniques used with process cameras.

While modern digital imaging systems have replaced traditional photo-conversion equipment in many printing facilities, process cameras are still used in many areas of the graphic arts industry. The use of film as an intermediate in producing printing materials is no longer as common a practice, but a basic knowledge of the principles of line photography is fundamental to understanding more advanced forms of reproduction.

Many of the techniques employed in processing digital images utilize terminologies and metaphorical steps which mimic traditional methods. An understanding of these steps and techniques will enforce your skills in the digital arena. It must be said that the most basic photographic techniques are universal. Most cameras share certain common and basic parts. Film is film. There are many special types for particular applications but the vast majority are comprised of the same basic elements which have been specially modified to perform a specific type of task.

An understanding of the photographic process will enhance graphic communications creativity and enable the production of better professional and/or personal photographic creations.

There will be extensive discussion of films, their variants, how they render

images and both the positive and negative aspects of the process. Become familiar with the important terms and definitely work any quiz and/or review questions.

The Halftone Process

There are many different materials and processes involved in halftone reproduction. In most graphic communications facilities today, halftone photography is no longer commonly performed; the preparation of continuous tone images for printing is done electronically with scanners, rather than process cameras. Halftone photography methods, however, are still practiced in some applications of reproduction and can be used to illustrate how images are converted for printing. Understanding how original copy is classified and evaluated for reproduction is an important part of the printing process.

By knowing and understanding the materials provided and the lecture information you will be able to:

- Evaluate different types of original copy.
- Identify materials which require screening for reproduction.
- Understand how halftone exposures effect reproduction.
- Identify different halftone screens.
- Process silver based films.
- Gain knowledge about different color separation techniques.
- Recognize the differences between fake (pseudo) and true duotones.

It is suggested that you read carefully and be prepared to participate in the class discussions which follow the lectures. You should know the other basic types of camera exposures in addition to halftones and be able to collect samples of various halftone reproductions which illustrate different screening techniques.

Film Processing

During presentation of these materials you will become more familiar with the standard equipment and procedures used in manual and automatic film processing. Automatic processing equipment has replaced manual techniques in many sectors of the graphics communications industry because it is more efficient and digital imaging systems have eliminated the use of film intermediates in graphic reproduction.

Manual processing is still performed in smaller production operations and the same chemical solutions and procedures used in traditional film development are applied to photosensitive materials in automatic processing. You will learn how to handle raw and processed films, learn about darkroom equipment, the names of the basic chemistries and how to mix and store them. You will be able to discuss the differences, advantages and disadvantages of automated processing when compared to manual methods.

Prepress Operations

These subjects are combined in this course as they are rather esoteric in nature and do not, generally, or directly impact the production designer and graphic communications personnel except for those actually performing these operations. The topics are covered in lecture however, because they are critical steps in the reproduction process.

Although manual stripping techniques are still used to produce film flats in the printing process, a great deal of the prepress work done now in the graphic communications industry is performed electronically on software programs capable of outputting platemaking films and image carriers.

While computer technology has led to the use of digital systems that are designed for electronic production, the

concepts involved in manual stripping still apply today and should be understood by prepress personnel.

You should develop a basic understanding of the equipment and processes presented to help relate to newer technologies now being used in prepress.

Contact printing methods are still used in duplicating and proofing applications. Although the use of computers in the graphic communications industry has resulted in a shift to electronic imaging systems, a basic knowledge of the manual processes used is important to understanding how images can be duplicated or altered from their original form.

Platemaking is a critical part of the printing process and has changed greatly in recent years. The rapid growth of digital technology in the graphic communications industry has had a tremendous effect on conventional platemaking methods and the entire production process. Traditional platemaking systems, in which light sensitive image carriers are exposed and processed by hand, have been replaced by newer technologies such as computer-to-plate (CTP). In electronic platemaking, images created with computer software are converted and transferred directly to image carriers, eliminating the use of film as a platemaking intermediate. While traditional platemaking techniques continue to be used in the industry, the application of CTP and other digital imaging systems is growing rapidly.

In some simple instances, stripping and imposition are invisible operations performed as part of the page layout operation and seamlessly transferred directly onto the plate via automatic, computer driven imaging systems.

We will discuss lithographic image carriers and the image carrier systems for relief, flexography and gravure, as well as screen printing.

